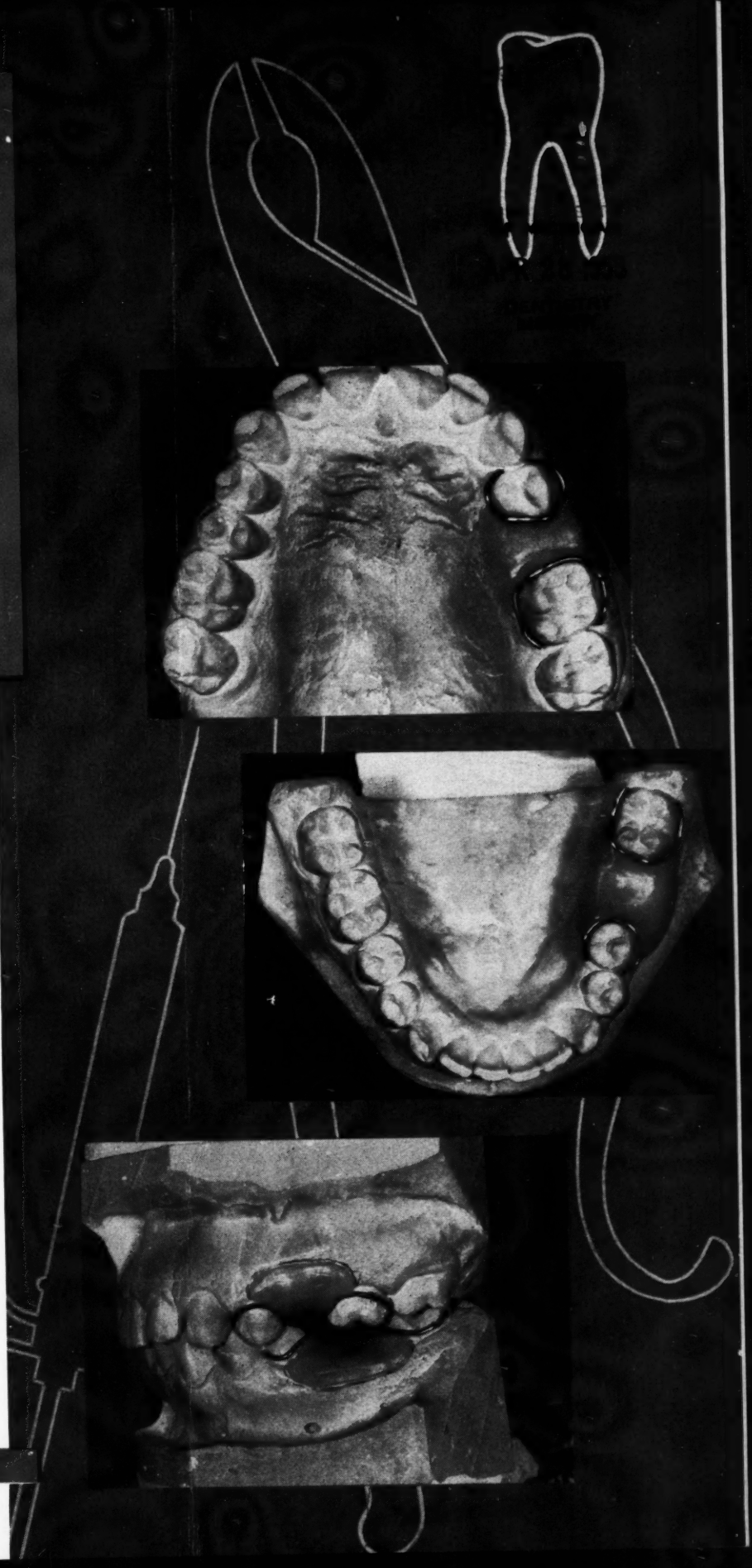
Dental Digest



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PHILLIP M. CHERNOFF, D.D.S. (The Thomas W. Evans Dental Institute, University of Pennsylvania, 1922) is represented in the dental literature by a number of articles on surgical and other techniques. In the current issue Doctor Chernoff presents the fourth and concluding installment of a series of articles on the subject of surgery versus bacteriology in the treatment of pulpless teeth.

R. J. COGGESHALL, D.D.S. (Northwestern University, Dental School, 1934) is a general practitioner and an enthusiastic user of the Airbrasive technique which has been in daily operation in his office for nineteen months. Doctor Coggeshall's article, COSTS AND OTHER CONSIDERATIONS IN OPERATIVE AIRBRASIVE TECHNIQUE, is a record of the cost of installing the unit with specific information concerning the application of the technique.

CHARLES JAY MILLER, B.S. (University of Pittsburgh, 1948), D.D.S. (University of Pittsburgh, School of Dentistry, 1950) specializes in crown and bridge techniques and full mouth reconstruction. For his first publication in DIGEST, Doctor Miller has the collaboration of his wife, Arline Miller, who made the illustrations for his article, THE TUBE IMPRESSION.

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HEMORRHAGE *in Relation to Dentistry*

FRANCIS J. SAMAHA, D.D.S., Arlington, Va.

DIGEST

This article enumerates the essential elements of the blood that are required for coagulation, analyses the method by which they function and the conditions in which they interact; and presents in definitive terms the modern concept of the mechanism of clotting of the blood. Practical suggestions, fully illustrated, are given for prevention of hemorrhage and for treatment of hemorrhage occurring after extraction of teeth.

Factors in Coagulation

Different views regarding the clotting of blood have been advanced from time to time. One theory which is generally known, that of Howell's, may be demonstrated by the following form:

Prothrombin + Thromboplastin + Ca(ions) → Thrombin

Thrombin + Fibrinogen → Fibrin

All of these factors are necessary for proper coagulation of blood to occur.

Prothrombin Production—Fibrinogen and prothrombin are formed in the liver. Prothrombin production is dependent upon sufficient quantities of vitamin K. When there is a deficiency of this vitamin and it is given therapeutically, liver function must be adequate in order for the vitamin to have any effect upon increasing prothrombin formation. Prothrombin formation is thus influenced (1) by a lack of vitamin K, and (2) by severe liver disease.

Vitamin K Absorption—Normally, it is difficult to produce a dietary vitamin K deficiency. Even if intake is inadequate, the intestinal bacteria synthesize sufficient quantities. However, its absorption is dependent upon adequate amounts of bile salts; when these are lacking due to an obstructive biliary disease or biliary fistula, vitamin K deficiency and deficient prothrombin formation results, with lengthening of coagulation time.

Fibrinogen Formation—Only in the presence of extensive liver damage is fibrinogen interfered with, so that in moderate liver disease only the prothrombin production may be affected.

Thromboplastin—When tissue cells are injured or ruptured, thromboplastin is liberated. This substance is found in blood platelets and in certain tissues of the body, e.g., the brain, lungs, thymus, and testes.

Calcium Ions—Never reduced enough to be considered a factor in prolonged hemorrhage, calcium ions may be excluded as an etiologic agent in hemorrhage.

Formation of Thrombin—The presence in the blood of (1) thromboplastin, (2) Ca ions, and (3) a plasma factor, prothrombin, is responsible for the formation of thrombin. If thromboplastin or prothrombin production is interfered with, either quantitatively or qualitatively, the production of thrombin will be altered and hemorrhage may result.

Definition—Hemorrhage may be defined as the escape of blood from the body through imperceptible openings in the blood vessel wall (hemorrhage by diapedesis), or through an actual break in the continuity of the vessel (hemorrhage by rhexis).

Varieties of Hemorrhage

The types of hemorrhage may be classified as follows:

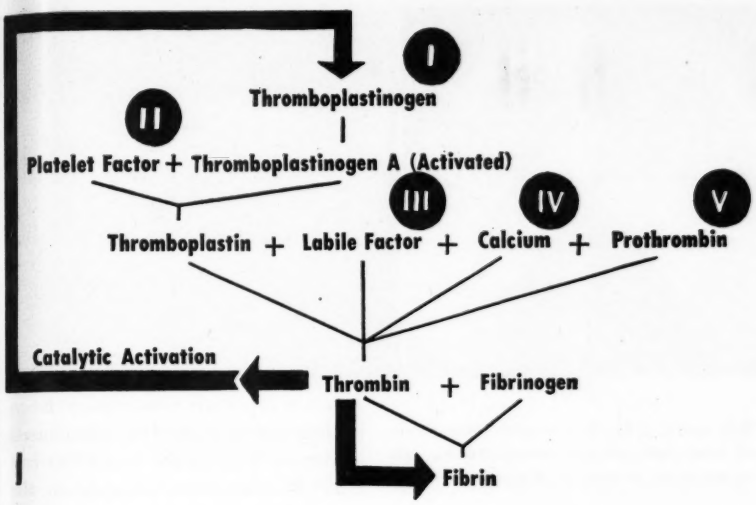
(1) *External and Internal*—(External hemorrhage is self-explanatory.) Internal hemorrhage may occur as petechiae, ecchymoses and hematomas. Petechiae usually is a result of disease, while eccymoses and hematomas are the result of a surgical operation or an accident.

(2) *Spontaneous and Traumatic*—Spontaneous hemorrhage occurs as the result of an operation. Traumatic hemorrhage occurs as a result of an accident.

(3) *Arterial, Venous, and Capillary*—Arterial hemorrhage is bright red in color and escapes under considerable pressure in a pulsating manner while venous blood is dark red in color and escapes more slowly in a steady stream. Capillary hemorrhage is characterized by a continuous oozing from the tissues.

(4) *Primary, Intermediary, and Secondary*—Primary hemorrhage is that which occurs at the time of operation or injury. After the cessation of primary hemorrhage there is usually a fall in blood pressure which permits clotting, because the blood flows with less force from the wounded vessels.

Intermediary Hemorrhage: After the patient rallies from the operation or injury, the blood pressure rises again, and the clot may be forced from the vessel. This usually occurs within twenty-four hours after primary bleeding has been controlled and



REMOVAL BY ADSORPTION

It is probable that the labilizing action of thrombin on platelets is mediated through its activation of thromboplastinogen.
In human blood, part of the prothrombin is in an inactive form, prothrombinogen.

PRIMARY FACTORS IN COAGULATION

I. THROMBOPLASTINOGEN
- a. Probably a globulin
- b. Deficient in hemophilia
- c. Determined by:
  1. Prothrombin consumption time
  2. Thromboplastinogen activity time

II. PLATELET FACTOR
- a. Probably a nonprotein
- b. Deficient in thrombocytopenia and thrombasthenia
- c. Determined by
  1. Platelet count
  2. Prothrombin consumption time

III. LABILE FACTOR
- a. Probably a globulin
- b. May be congenitally deficient and is reduced in liver damage
- c. Determined by its correcting action on the prothrombin time of stored human plasma

IV. CALCIUM
- a. Probably combined with one of the other clotting factors
- b. Never diminished enough to affect coagulation

V. PROTHROMBIN
- a. A glycoprotein
- b. Diminished by lack of vitamin K, antivitamin K compounds, liver damage, and congenital defect in synthesis
- c. Determined by
  1. Prothrombin time

(*Adapted from* GP 6:44-45 (*December*) 1952)

is called intermediary hemorrhage.

Secondary Hemorrhage: Usually occurring any time after twenty-four hours, secondary hemorrhage may follow suppuration or sloughing and presents a special difficulty as the vessels may be extremely friable or held in a dense inflammatory mass.

Systemic Factors

The most important factors which influence the coagulation of blood are the following:

Hemophilia
Purpura hemorrhagica (thrombocytopenia)
The leukemias
Primary anemias and severe secondary anemias
Agranulocytic angina
Chlorosis
Hodgkins disease
Polycythemia vera
Hypertension
Jaundice
Septicemia
Vitamin C and K deficiency
Arteriosclerosis
Diabetes mellitus
Metal poisoning
Endocrine disturbances

Hemophilia a Serious Problem in Dentistry—One of the most serious problems that a dentist has to deal with is hemophilia which is a hereditary disease occurring in males but transmitted through females and characterized by a prolonged coagulation time of the blood.

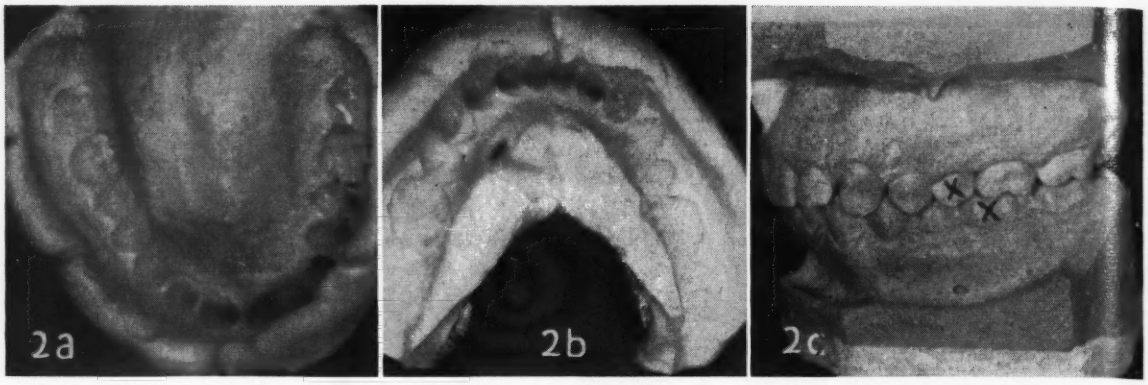
Clotting Time Varies—Prolonged clotting time may vary from minutes to as long as twelve hours. Normal blood and normal cell-free plasma contain coagulation factors not found in hemophilic blood. This has been known for a long time.

Clotting Time Reduced by Transfusions—If transfusions of either whole blood or normal plasma are given, the time required for coagulation of hemophilic blood is notably reduced. This is proved by the fact that if transfusions of hemophilic blood or plasma are given, the time required for coagulation of the blood is markedly prolonged.

Blood Substitute

During World War II a blood substitute, Fraction I, was discovered and found to be extremely valuable in shortening the clotting time of hemophiliac subjects. Fraction I is obtained through the fractionization of human plasma, requires no typing, and can be stored in small refrigerated vials for considerable periods. The chief advantages of this agent over whole blood are that it supplants to a large degree the multiple transfusions of whole blood, and eliminates the problem of securing donors of the homologous group blood.

Administered Intravenously—The average dose of 400 milligrams in 20 cubic centimeters of physiologic saline solution is administered intra-



2A and 2B. ***Impressions are made of both jaws using a non-irritating soft impression material. Alginate is ideal.***

2C. ***The models are articulated (X) showing teeth to be extracted.***

venously. A few minutes after injection of the plasma fraction (or antihemophilic globulin fraction), the blood coagulation time is usually reduced to about twenty minutes, and reduction is continued for several hours.

Injection May be Repeated—The effect of the injection will last approximately twenty-four hours when a second injection is given if necessary. But when there has been considerable loss of blood, or when Fraction I is ineffective (as it is in some cases), whole blood must be relied on to control the hemorrhage of hemophiliac subjects.

Procedure for Extractions

In the management of hemophilia in a patient where extractions are indicated, a thoroughly satisfactory procedure is used at Boston City Hospital:[1]

1. An impression is made of both jaws using a nonirritating, soft impression material, and the models are articulated.

2. The tooth or teeth to be extracted are removed from the model, being careful not to touch the socket or surrounding gingiva, and a pink acrylic splint is constructed with a saddle covering the entire socket and area adjacent to the tooth to be extracted, but not in contact with the opposing bite.

3. Simple single wire clasps are added for retention and stability.

4. Care must be taken to be sure that the splint is immobile and applies no pressure on the wound as this may disturb the clotting and healing mechanism. The splint merely acts to protect the wound and to hold the hemostatic agents in the socket.

5. The teeth and their gingival attachments are loosened with small orthodontic type rubber bands placed around the neck of the teeth. When one disappears under the gingiva, another is placed over the first until the tooth is gradually loosened from its socket.

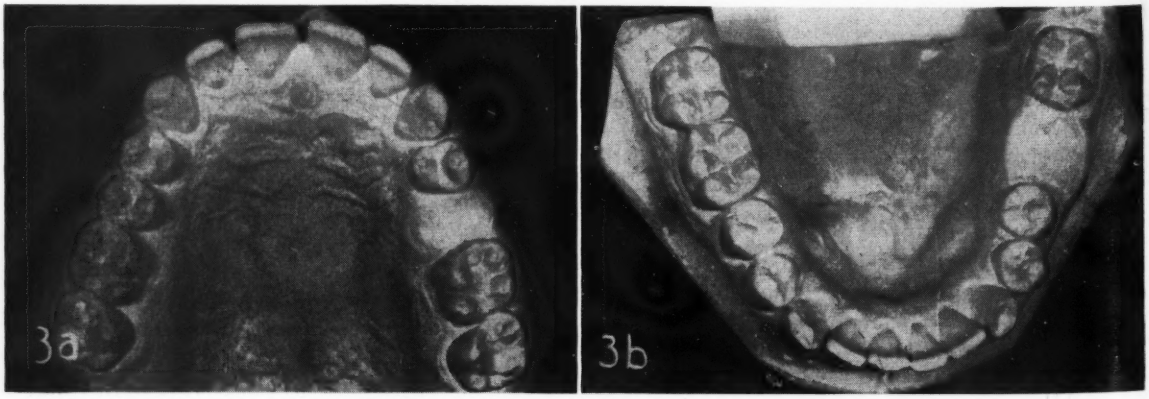
6. Intravenous injection of 400 milligrams of plasma Fraction I, or transfusion of 200 cubic centimeters of whole blood is given preoperatively and postoperatively.

7. Local periodontal infiltration anesthesia (between the tooth and gingiva), leaving a single wound (the socket) is preferred. If mandibular teeth cannot be anesthetized in this way, a general anesthetic is advised being careful to prevent bruising of tissue during the excitement stage.

8. Extraction is slow and careful, one at each operation, avoiding the use of elevators, flap operations, and suturing whenever possible.

3A and 3B. ***The teeth to be extracted are removed from the model, being careful not to touch the socket or surrounding gingival area.***

[1]White, P. H., and Mallett, S. P.: Management of Hemophilia, J. Oral Surg. **7**:237-246 (July) 1949.



9. The wounds are dressed with thrombin powder in conjunction with gelfoam® or oxycel® which is inserted loosely into the socket, no pressure being applied.

Additional Extractions—The same splint may be used by extending it to include subsequent teeth to be extracted which may be completed in about two weeks.

Use of Acrylic Teeth—If anterior teeth are to be extracted, acrylic teeth can be inserted into the splint to provide esthetics.

Acute Infections Rare—It is stated that acute infections are rare in hemophiliac patients despite their seemingly extreme neglect. In the event of an acute infection, however, a sulfonamide or orally administered penicillin can be given to combat the condition. Intramuscular injection of penicillin is not advised because of the possibility of intramuscular hemorrhage.

Hemostatic Agents

A host of hemostatic agents available for the dentist in checking hemorrhage are obtained from four sources:

(1) Vegetable (tannic acid, gambir)

(2) Mineral (alum, ferric subsulfate)

(3) Animal (adrenalin, thromboplastin)

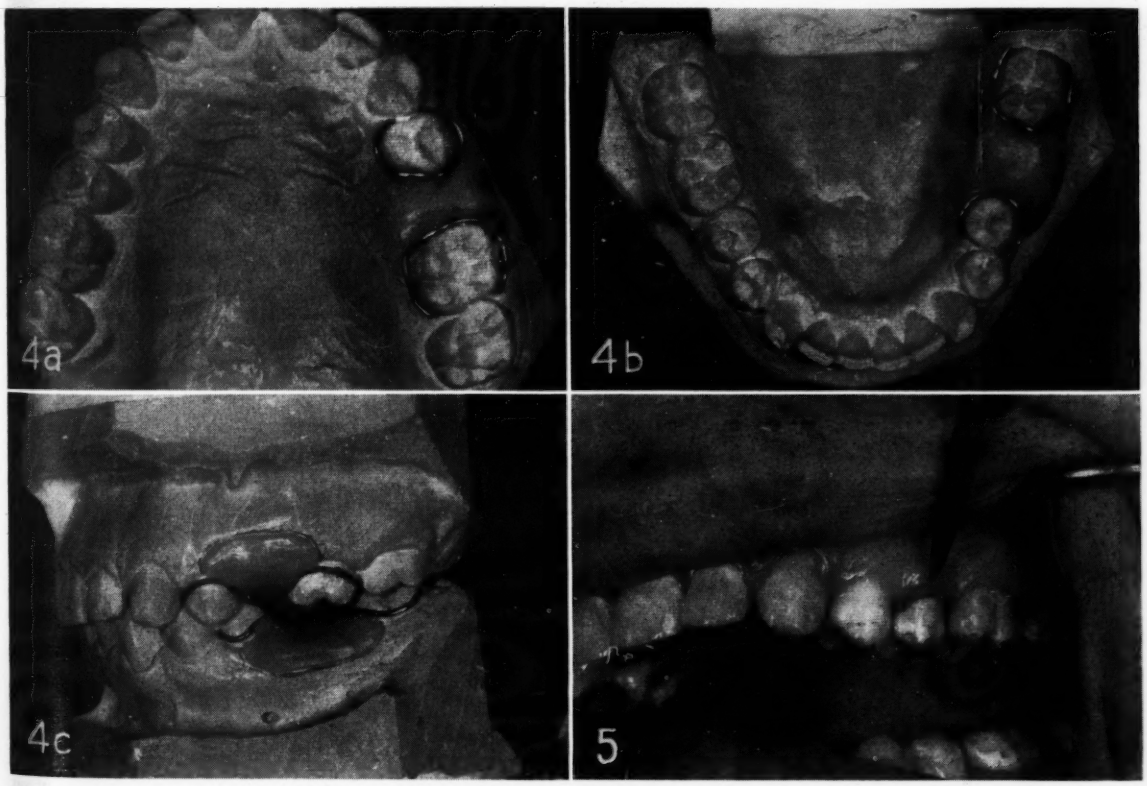
(4) Human (fibrin foam)

Classification — Hemostatics are classified according to their mode of action: (1) Mechanical, acting locally (absorbent cotton); (2) astringents and caustics, acting locally (tannic acid and alum); (3) thromboplastic substances, acting upon the blood (thromboplastin); (4) substances acting through the sympathetic nervous system, producing vasoconstriction (epinephrine); and (5) substances acting on the blood after absorption (calcium lactate).

Nature Aids in Control—It is apparent that nature helps in the control of hemorrhage. When bleeding occurs there is an immediate decrease in coagulation time. Vasoconstriction and coagulation of the blood occurs. The contraction of the muscular walls of the blood vessels aids significantly in clot formation, and organization results. The clot is replaced by fibrous tissue which permanently occludes the vessel.

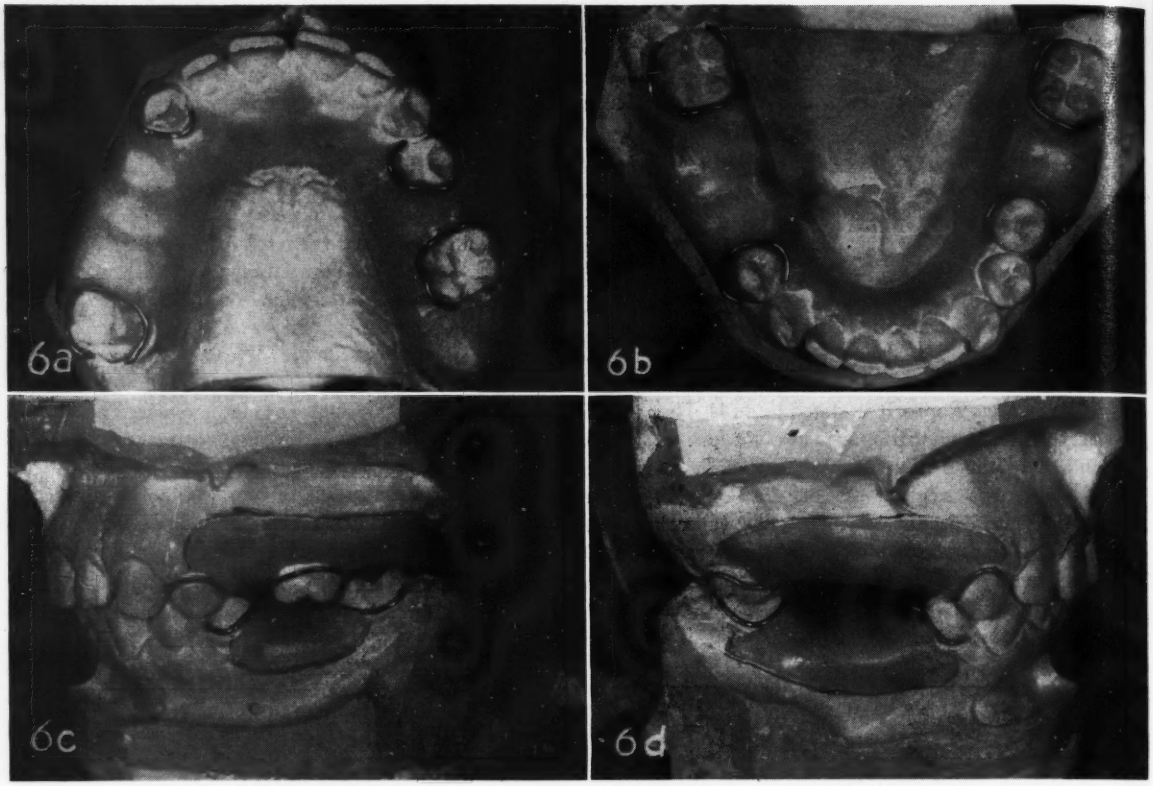
Artificial Control of Hemorrhage

Both internally and externally hemorrhage is controlled by artificial means. Internally, hemorrhage is



4A, 4B, and 4C. ***Pink acrylic splints are constructed with saddle covering the entire socket and area adjacent to the tooth to be extracted, (Figures A and B), but not in contact with the opposing bite (Figure C). Simple wire clasps are added for retention and stability. Care must be taken that the splint is immobile and applies no pressure on the wound as this may disturb the clotting and healing mechanism. The splint merely acts to protect the wound and to hold the hemostatic agents in the socket.***

5. ***The teeth and their gingival attachments are loosened with small orthodontic type rubber bands placed around the neck of the teeth. When one disappears under the gingiva, another is placed over the first until the tooth is gradually loosened from its socket.***



6A, 6B, 6C, and 6D. ***Additional extractions can be performed in about two weeks, using the same splint by extending it to include subsequent teeth to be extracted.***

controlled by the following measures:

1. By the administration of blood transfusions, vitamins K, D, C, and P, given intramuscularly. (Vitamin P is the new permeability vitamin which is reported to be extremely effective in aiding hemorrhage control.)

2. Calcium lactate and calcium gluconate, applied intravenously. (The Council on Dental Therapeutics states, however, that the use of calcium salts appears irrational.)

3. Gelatin, koagamin, Congo Red, and adrenalin (1:1000) given intravenously; and in hemophiliac cases, ovarian extract.

Use of Barbiturates—Morphine sulfate (hypodermically) or any of the barbiturates given preoperatively will aid in slowing the circulation and quieting the patient, for it is known that hemorrhage is more likely to occur in a patient with high blood pressure than in one with low blood pressure.

External Hemorrhage — Hemorrhage may be controlled externally (1) by applying pressure and/or packing with iodoform gauze saturated with tannic acid or alum (or applied in powder form); (2) the use of ferric subsulfate (Monsel's salts), ferric chloride, turpentine, phenosulfonic acid applied on cotton; (3) carbolized resin, viper venom; or (4) Timberley's "hemorrhage control" made from the white of eggs. All these agents function by precipitating the proteins of the blood.

Additional Measures—(1) Adrenalin hydrochloride, which functions by contracting the exposed ends of blood vessels, may also be used in the control of external hemorrhage. (2) Thrombo-tyrothrycin cones which have a biochemical action only, are available. (3) Fibrogen, hemostatic globulin, and thromboplastin (also called coagulin), may be used. (4) If bleeding is from bone, bone wax may be applied, or the bone can be burnished or crushed by tapping with a blunt instrument.

Hemostatic Materials Used in Dentistry

Three satisfactory, non-irritating foreign materials for the control of hemorrhage tested and reported by Gwinn, Grimm, and Ferber[2] have become extremely popular and have been found to be among the best of the various hemostatic agents available for dental purposes. They are (1) fibrin foam (from human blood), (2) oxycel (oxidized cellulose), and (3) gelfoam (from animal gelatin).

Removal Unnecessary — Experiments were undertaken to develop a substance possessing hemostatic powers that could be placed in a tooth socket and be held in by sutures or packed in with sufficient pressure to hold without sutures; and which

[2]Gwinn, C. D.; Grimm, D. H.; and Ferber, E. W.: Oral Use of Absorbable Oxidized Cellulose in the Prevention and Treatment of Postoperative Hemorrhage, J.A.D.A. **36**:155-159 (Feb.) 1948.

7A and 7B. *If anterior teeth are to be extracted, acrylic teeth can be inserted into the splint to provide esthetics. Left and right maxillary lateral incisors are shown inserted into splint.*

would not require removal, thus avoiding secondary hemorrhage which often accompanies removal of the agent. Many of the agents used to arrest hemorrhage are destructive to the tissues.

Material is Absorbed—The three agents mentioned can be left in the tissues and will either dissolve or be absorbed without producing marked irritation or interfering with healing to any extent. These agents have been found definitely useful in dental surgical operations. It is thought that their effectiveness is induced (1) by increasing the surface area offered to the blood, and (2) by exerting a slight pressure from swelling of the substance when filled with blood. They are absorbed in about four to six weeks.

Bleeding From Small Vessels—Application of hemostatic forceps to the vessel, suturing the tissue, or cautery may be effective in arresting hemorrhage when bleeding is from small vessels. Cold applications to the general area of hemorrhage and heat to the immediate area are helpful. Cold effects vasoconstriction but increases coagulation time, while heat hastens coagulation but prolongs bleeding due to vasodilation.

Control of Excessive Bleeding—In cases where bleeding is excessive and cannot be controlled by other simpler means, the main artery supplying the area may be ligated in the following way:

1. When the vessel is large enough it is caught by a forceps and tied with a suitable ligature of catgut which should include no more extraneous tissue than necessary.
2. The assistant holds the hemostat up so that the end of the vessel is visible; the suture is passed around it and tied.
3. This compresses and destroys the intima of the vessel, thus causing coagulation of the blood at that point.
4. In ligating a large artery, care must be taken not to injure the intima as the ligature may break through the vessel.

Ligation of External Carotid Artery

The vessels most commonly ligated for prophylactic reasons are the external carotid artery and, in tumor surgery, the external jugular vein. Ligation of the external carotid artery will arrest most severe hemorrhages in the region of the jaw and face. The following is the procedure, according to Thoma,[3] for completing this operation:

1. The patient is placed with his head in a backward position.

[3]Thoma, Kurt H.: Section on hemorrhage in textbook, Oral Surgery, St. Louis, C. V. Mosby Company, 1948.

8. *When confronted with severe or a secondary hemorrhage following extraction of teeth, a modeling compound splint can be molded to contour to form a matrix after the socket has been treated.*

2. A 5 to 7-centimeter incision is made along the anterior border of the sternomastoid muscle, beginning 2 centimeters below the angle of the mandible and extending as far as the thyroid cartilage. The incision should divide the skin and the platysma which passes upward to the lower border of the mandible.

3. After division of the cervical fascia, the edge of the sternomastoid is retracted backwards, exposing the digastric muscle and hypoglossal nerve below, which is recognized by its curved course.

4. After retracting these structures, the carotid sheath is opened and the jugular vein is encountered. If not to be tied, it is pulled back with a blunt retractor to expose the external and internal carotid arteries.

5. The common facial vein crosses the bifurcation of these vessels above which the superior thyroid artery arises. It may be ligated and divided to provide better exposure.

6. The external carotid artery is a strong, whitish vessel, while the internal carotid, located medially and behind the external, is smaller in size and gives off no branches. After giving rise to the thyroid artery, the external carotid also gives origin to the lingual artery.

7. After it is dissected free from the internal carotid and vagus nerve, the external carotid is tied with a ligature introduced by means of an aneurysm needle which is passed from without inward to avoid inclusion of the descending hypoglossal nerve which lies posterior and superficial to it, and the superior laryngeal nerve which crosses beneath the artery.

Blood Supply Checked—By means of the ligation described, the blood supply by the lingual, facial, occipital, internal maxillary, and temporal arteries is checked.

Method of Ligation—The most commonly recommended method of ligation is Babcock's double ligation with division of the artery between the ligatures. This gives greater security against hemorrhage than ligation in continuity. Chromatized catgut or silk may be used.

Drain May be Used—The wound should not be closed until all bleeding has been arrested, since continuous bleeding may result in a hematoma. If there is any possibility of bleeding, a drain should be inserted for drainage externally, and removed after twenty-four hours.

Prevention of Hemorrhage

There are no known drugs for oral administration which will speed the clotting of normal blood. Hemostatics cannot be injected or absorbed into the blood stream without producing coagulation inside the vascular system.

Replacement by Transfusion—Natural replacement of blood in the body is accomplished by fluids passing into the blood stream to replace the lost fluid volume (1) by contraction of the spleen and other blood reservoirs for immediate replacement of blood cells, and (2) by an increased production of blood cells by red bone marrow. The only artificial manner in which blood is replaced in the body is by blood transfusion.

Coagulative Properties of Blood—The first step in the treatment or prevention of hemorrhage should be a careful investigation of the coagulative properties of the blood. If clinical tests have not already been made, the clotting time, bleeding time, prothrombin time, platelet count, and serum calcium level should be made in that order of importance:

1. Clotting time, that is, the time it takes blood to coagulate is normally three to eight minutes.

2. Bleeding time (duration of bleeding that follows puncture) is normally one to four minutes.

3. Prothrombin time is obtained by adding varying amounts of calcium chloride to portions of oxalate plasma. The coagulation time of the tube that clots earliest is the prothrombin time.

4. The blood platelet count is normally 500,000 to 600,000 per cubic millimeter. The platelet count is useful in diagnosis of purpura hemorrhagica (thrombocytopenia).

5. Blood calcium determination is of questionable significance. In referance to postoperative hemorrhage, the bleeding and clotting times are not absolutely reliable, but where it is known that the bleeding or clotting time is high, caution can be taken and careful study of the case made.

Method to Determine Bleeding and Clotting Times—One method for determining bleeding and clotting times is the following:

1. Put several drops of blood from the ear or finger on a clean slide. The blood should flow from the part without squeezing, as squeezing produces a mixture of blood and tissue fluid which lessens clotting time.

2. The point of a clean needle is drawn through the blood at one-minute intervals until there is a distinct fiber which will adhere to the needle a little before the true clot is formed.

Second Method—Another method which is popular at present is the following:

1. Nick the tip of the ear or finger and permit blood to run into a capillary tube 1½ millimeters in diameter.

2. A short section of the tube is broken off at one-minute intervals.

3. As soon as coagulation occurs, the fibrin is seen stretching between the broken ends of the tube.

These are the simpler methods for determining bleeding and clotting times. There are various other methods such as Howell's, and Lee-White's which, however, require venous blood.

Treatment for Hemorrhage Following Extraction

When confronted with severe or secondary hemorrhage following extraction of teeth, the following simple effective method of treatment is suggested:

1. Wipe the mouth and area of bleeding clean of all partly clotted gels of blood and enmeshed debris to observe the exact site and cause of bleeding.

2. Remove any rough or loose fragments of bone which may be present.

3. Apply the therapeutic agent indicated for hemorrhage control described previously.

4. When necessary, a modeling

compound splint can be molded to contour to form a matrix.

5. The patient should be instructed to apply cold packs externally, thirty minutes on and thirty minutes off, for two or three hours, and to refrain from taking stimulants or rinsing the mouth.

6. A calm attitude and rest with the head elevated will minimize circulation to the area which will support the other procedures.

7. Any other postoperative instructions that are thought necessary can be prescribed. If the patient is incapacitated or too distraught and excited to remember instructions, they should be written down for him.

Physical Symptoms from Hemorrhage—After prolonged bleeding, the patient may develop general effects such as faintness, nausea, weak rapid pulse, rapid breathing, continued fall in blood pressure, thirst, and pale cold skin and mucous membrane. Temperature is usually subnormal unless there is fever from infection. If bleeding is not checked, the patient could develop cerebral anemia, dizziness, headache, failing sight, ringing of ears, mental disturbances, loss of consciousness, and finally, death.

Indication for Transfusion—In all cases of severe hemorrhage, if the hemoglobin is below 50 per cent and the red blood count is below 3,000,000 per cubic millimeter, blood transfusions are indicated. (Normal RBC is 5,000,000 per cubic millimeter.) Usually, 500 to 1000 cubic centimeters of blood are required for transfusion. General medication, if indicated, should be administered intravenously if possible, for quick effect.

Conclusions

1. To prevent hemorrhage a dentist must have a comprehensive knowledge of the causes of hemorrhage, and be exact in diagnosis and preoperative preparation. When there is suspicion of a tendency to bleeding the patient should be questioned thoroughly as to his physical condition, and a general physical examination should be made by a physician. Caution should be exercised in extractions and other surgery. The patient's general health should be brought to an optimum level.

2. An attempt to eliminate preoperatively any possibility of postoperative hemorrhage will be of value in treating patients who have a tendency to hemorrhage.

3. The dentist should remember that some hemorrhage is a normal physiologic reaction and that normal healing of a wound cannot take place without it. If bleeding should be excessive, however, the dentist can be reassured because of the many modern methods of treating hemorrhage that are available.

Bergstrom Air Force Base.

The Superior Visceral Skeleton

Composition

The superior visceral skeleton consists of the following parts: mandible, hyoid bone, tongue, thyroid cartilage, cricoid cartilage, arytenoid cartilage, salivary glands, and the muscles, ligaments, fasciae, nerves, and blood vessels supplying these parts.

Suprahyoid Group Included—Dentists are accustomed to thinking of the masticatory mechanism as consisting of the teeth, maxillae, mandible, and the immediately attached muscles. In that sense it is customary to list, in the depressor group of muscles of mastication, only the suprahyoid group.

The Hyoid Bone—Since the hyoid bone is not attached to any other bone but floats freely in the submandibular region, it must be supplied with stabilizing infrahyoid muscles to enable it to resist the pull of the suprahyoid muscles.

Whiffle Tree of the Dental Apparatus—Because the hyoid bone is situated between and serves for the attachment of two sets of muscles, it is called by Stoll the whiffle tree of the dental apparatus. Because of this arrangement also it is necessary to regard the infrahyoid muscles as a part of the musculature of the dental apparatus.

Role of the Hyoid Mechanism

During mastication, the suprahyoid muscles, braced through the intermediary hyoid bone of the infrahyoid muscles, depress the mandible, aided by gravity, as food is taken into the mouth and after each chewing stroke produced by the supramandibular muscles.

Act of Swallowing—After mastication, swallowing takes place. This starts with the passage of food to the pharynx propelled by the tongue and the soft palate. During this act the jaws and teeth are closed and the hyoid bone is raised and retracted by the stylohyoid and digastric muscles. The larynx is simultaneously elevated by the thyrohyoid and stylopharyngeus muscles; during this time the infrahyoid muscles relax.

Action of Suprahyoid Muscles—When the act of swallowing is completed, the anterior belly of the digastric and geniohyoid muscles contract and, again aided by gravity, depress the mandible. If no more food is taken into the mouth the mandible assumes its rest position with the teeth slightly parted. The hyoid bone then drops to a position slightly below the mandible through the tonic contraction of the infrahyoid muscles. Against the fixed position thus attained, the suprahyoid muscles can act, opening the jaws preparatory to further mastication and deglutition.

Harmful Influence of Malposture—These successive acts must be accurately timed and balanced in relation to each other if they are to be completed without muscle strain. It has been found that when there is malposture of the mandible there is a varying interference with the cycle of muscle contractions and relaxations and corresponding demand for conscious effort in performing these acts. This leads to fatigue and discomfort of varying degree.

Adapted from *Dental Concepts* 4:5-6 (July-August) 1952.

Fixed

BRIDGE

Assemblage

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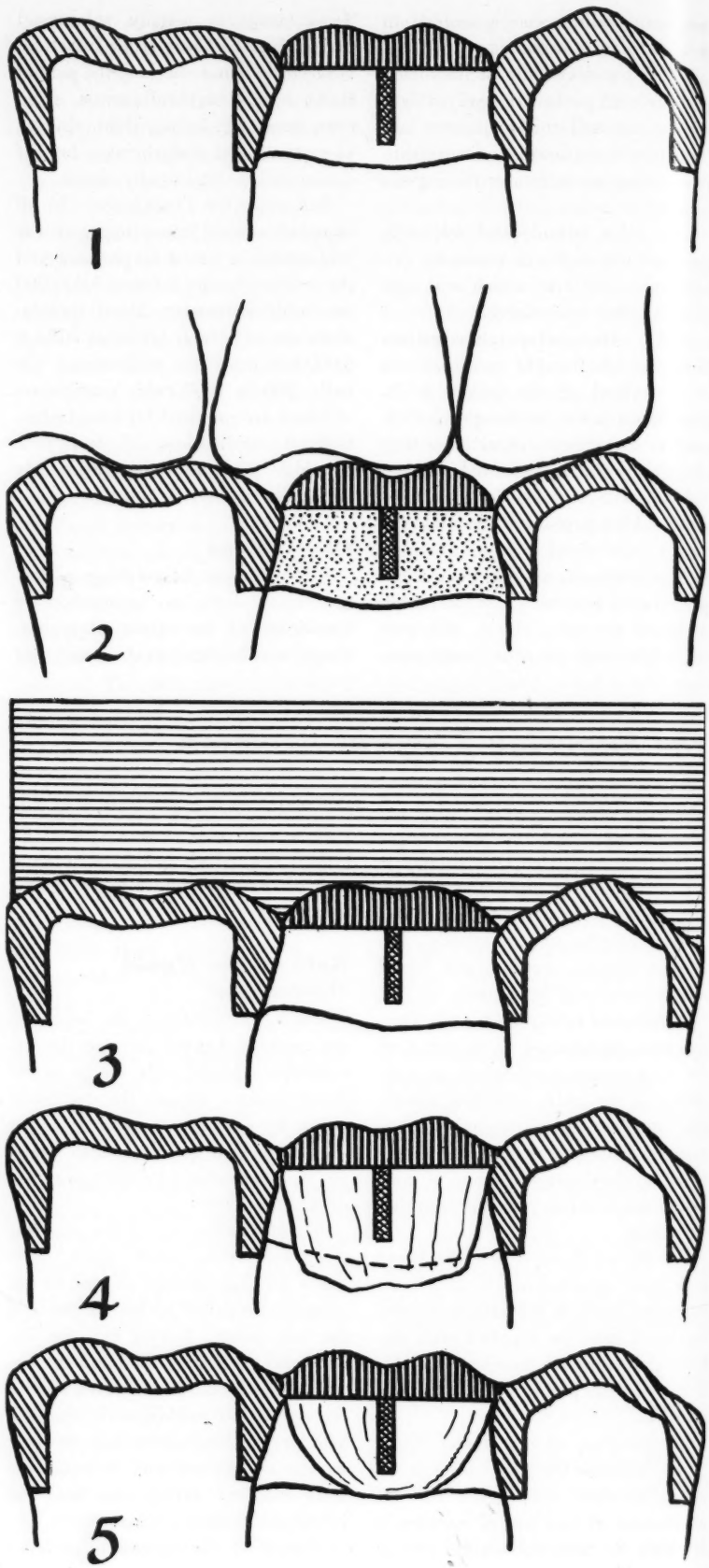
DIGEST

A new technique in the assemblage and completion of posterior fixed bridgework is possible with the recent introduction of prefabricated gold occlusal pontics in graduated sizes and shapes. This article gives step-by-step instructions for completing a technique for fixed bridge assemblage.



1. *Abutment inlays in position. Gold cusps selected and fitted.*
2. *Pontic in position in compound and occlusion checked.*
3. *Occlusal index to assemble inlays and pontics.*
4. *Assembled bridge in position. White wax roughly inserted under the gold cusp.*
5. *White wax contoured to proper shape, retaining minimum ridge contact.*

Advantages of Fixed Bridge Assemblage

Direct fabrication of the pontic and subsequent bridge assemblage has the following advantages:

1. Occlusion can be checked in all excursions and requires no adjustment at the final insertion.

2. Abutment inlays are in exact position, ensuring that the plaster index is correct. (Most indirect techniques take an index from a model on which the inlays may have been disturbed.)

3. Perfect adaptation of the pontic ridge lap is obtained. There is no possibility of overcompression.

4. The cost, operative time required, and remakes are reduced considerably.

Disadvantages of Indirect Method

The method in current use of assembling indirectly stationary replacements on models has the following disadvantages:

1. No articulator perfectly duplicates jaw relationship.

2. The additional steps required add to the possibilities of error in technique.

3. Considerable laboratory time is necessary (or expense if a commercial laboratory is employed).

Technique

Direct assemblage of the fixed bridge can be completed simply with the following technique:

1. The teeth are prepared in the customary manner and the inlays or crowns are placed in position.

2. A gold cusp of the proper size is selected by trying in the mouth and the necessary mesial and distal reductions are made.

3. Modelling compound is softened and placed between the abutment teeth; the fitted pontic remains in position until the marginal ridges are in alinement. The compound is then chilled. A positive position for the pontic has now been obtained.

4. The patient is instructed to bite down gently; occlusion is checked in all excursions. The pontic can be removed, ground in the operator's hand, and can be reseated in the exact position as often as necessary to perfect the occlusion.

5. As soon as occlusion is obtained, an occlusal index in plaster is taken to assemble the pontic to the inlays. (This follows the standard laboratory technique.)

6. The assembled bridge is fitted. No occlusal adjustments should be necessary.

7. Softened white inlay wax is forced under the gold cusps of the pontic. The bridge is removed and the white wax contoured to form a harmonious tooth. The bridge is tried in once more to check the saddle of the pontic.

8. The patient is dismissed. The acrylic base in the proper shade is processed on to the gold.

9. The polished bridge is ready to be inserted without adjustment.

Discussion

1. Objectives which are virtually impossible with the indirect approach have been accomplished with the technique described.

2. It is possible to balance a bridge in lateral as well as in centric with this technique and thus maintain the complete balance of the mouth.

3. Because the saddle is a direct impression, the tissue is never overcompressed.

4. The cost of the bridge is reduced.

332A *9th Street.*

Fluoridation of Water Supplies

Use of fluorine in public water supplies for prevention of dental caries has been debated during recent years. This problem has arisen because of the advocacy of the addition of this element to the public water supplies by the United States Public Health Service and various state health departments. The policy has been established by the public health agencies that the addition of fluorine must have the approval of the local medical society, which therefore should be well grounded in the facts and should make recommendations only after impartial review of all evidence. To one trying to read objectively the report of the congressional hearing on fluoridation of public water supplies, it appears that the representatives of the public health field have developed considerable enthusiasm for a method of caries control that is relatively simple and for which, considering the benefits to be obtained in the reduction of dental caries of from 35 to 65 per cent, the cost is not excessive. The work done so far has been directed largely toward proving the effectiveness of the method in the control of caries, and the efforts that have been made to determine the ill effects of this material have been restricted to small groups of children and to test group of some five or six adults. The committee that held these hearings was not, in its final report, willing to endorse the fluoridation of water. Apparently enough doubt was expressed that it seemed desirable to perform further experimental work before universal endorsement is given.

From Medical Literature Abstracts, *Journal of the American Medical Association* **151**:589 (Feb. 14) 1953.

SURGERY VS. BACTERIOLOGY

in Pulpless Tooth Management

PART FOUR

PHILLIP M. CHERNOFF, D.D.S., Middletown, Conn.

In the fourth and last installment of this series of articles on the merits of the surgical approach to the management of pulpless teeth, the author presents a step-by-step description of the technique he uses in performing an apicoectomy.

Surgical Technique

The area about the tooth to be operated on should be protected from possible contamination with saliva by placing cotton or gauze rolls beneath the cheeks on both sides of the field. A large gauze pad is placed between the jaws anteriorly and the patient is instructed to close on it and to keep the teeth in occlusion throughout the entire procedure.

The Preparation—1. The lip is raised and the visible surfaces are painted with Talbot's iodine; the teeth are painted as well as the mucous membrane.

2. The incision is made with a sharp lancet; the depth of the incision must extend down through the periosteum to the alveolar bone.

3. The operator must feel the lancet point sliding along the actual surface of the bone. This is important because, if done properly, the measure will permit the periosteum to be lifted and retracted with the flap without serious injury.

4. If the incision only reaches, but does not penetrate, the periosteum the subsequent effort to expose the bone will result in a mutilation of the periosteum which will accentuate postoperative discomfort and delay healing.

5. The length and shape of the incision may vary but as a rule it should be crescent-shaped with its convexity toward the gingiva. Beginning approximately at the level of the apex to be removed, and to one side of it (usually directly over the apex of the adjacent tooth) the line of incision is downward, around and up again, and ends, usually, directly over the apex of the adjacent tooth on the other side (Fig. 1).

6. In a straight line from the starting point across to the termination of a crescent thus formed the distance is approximately half an inch. The downward course is guided by two considerations:

(A) The incision should not be extended downward too close to the gingiva lest, by leaving too narrow a strip between the incision and the gingival border, nutrition is endangered.

(B) The incision must extend low enough so that when the window in the alveolar plate is made there will be a fair amount of bone surface exposed between the lowest border of the incision and the lowest border of the window through which the apex and periapical infection is to be removed.

Supporting Surface of Bone—A surface of bone is necessary to a proper readaptation of the mucoperiosteal flap at the end of the operation as it maintains the flap in its proper position (Fig. 4). Without this supporting surface of bone, the flap would tend to collapse, thus endangering the proper regeneration of the underlying tissue.

Bleeding Controlled—With only a moment or two of thought before the lancet is applied the operator can determine the exact level at which the low point of the incision should be placed. To make this incision the author generally uses a Bard-Parker

1. ***Showing position and length of the incision for apicoectomy of an upper lateral incisor.***

blade, Number 11. Any bleeding that ensues as a result of the incision is easily controlled by the application of a small (2 by 2) exodontia sponge or the aspirator.

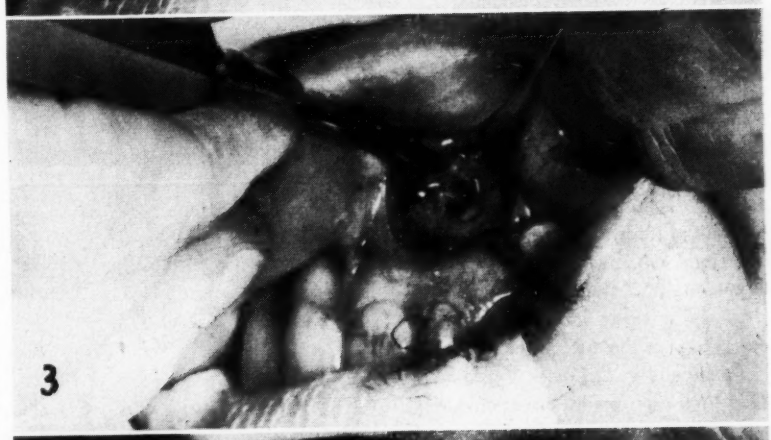
Periosteal Elevator Used as Retractor—The mucoperiosteal flap is raised to the desired level by the proper application of the periosteal elevator, periosteotome (Cleve-Dent Number 1). It is important to remember at this point that the periostcal elevator (as the lancet was used) must reach the surface of the bone in order to peel and lift up the periosteum properly.

The same mucoperiosteal elevator is used as a retractor; but not hooking into or pulling on the soft tissue. Such procedure is not only brutal but unnecessary. The elevator end of the mucoperiosteal elevator is used, the end placed firmly upon the bone over the apex and above the point at which the upper border of the window will be placed. Make sure that the end is securely in contact with the bone without danger of slipping. Hold it against the bone and permit the flap to rest upon it.

Clear Operating Field Ensured—Any bleeding that now takes place is controlled by the aspirator again so that the field may be perfectly clear for the operator to determine the exact location and borders of the window he is about to make (Fig. 2).

Optional Incision for Central

In the case of an upper central incisor when the deviation of the root from the median line is so slight as to prohibit making a crescent-shaped incision without injuring the frenum, the operator may resort to the type of incision and flap usually employed in the surgical removal of teeth. The



2. *Retraction of the flap and outline of window.*

3. *Exposure of periapical area; the apex is in view.*

4. *After resection. Edges of the flap must be supported by a surface bone.*

5. *Showing where sutures should be placed.*

following method may be employed:

1. Two straight lines are formed. The first starts at the distolabiogingival point angle of the central and extends upward and distally to a point directly over or even slightly distal to the apex of the adjacent lateral.

2. The second line of incision starts at this point and extends upward and mesially to a point above and mesial to the apex of the central, ending before reaching the frenum (Fig. 6). When returned to place the flap is supported by the alveolar bone overlying the lateral (Fig. 8).

Sutures Necessary—In this type of flap three or four sutures will be necessary; two at the ends of the incision described as the first line (one near the gingiva and one near the apex of the lateral) and a third suture about midway along the incision, described as the second line (Fig. 9). Occasionally a fourth suture may be required midway along the incision described as the first line.

Incision for a Lower Incisor—1. This may be made crescent-shaped with its convexity toward the gingiva, following in general the same procedure as for an upper incisor except that the curve is reversed.

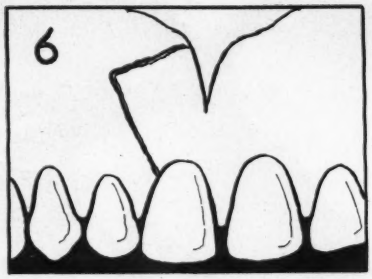
2. The author has found it more convenient to have a wider surface of bone exposed in lower cases than is provided by a crescent-shaped flap; it is also more convenient to have a more extensive flap. A rather wide square or rhomboid-shaped flap is therefore made in these cases.

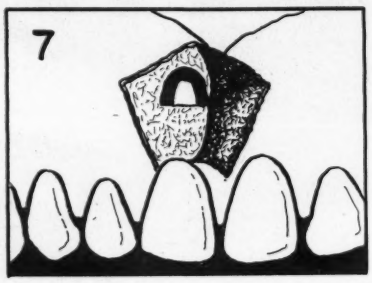
3. To avoid mutilation of the flap and to ensure satisfactory visibility, the flaps are made wide enough to include three teeth, the one to be operated on, and one on either side of it (Fig. 10).

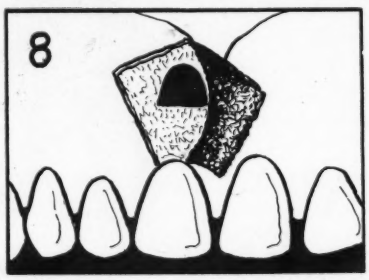
4. The incisions are made vertically or slightly diverging, beginning from the labiogingival surface of the teeth on either side of the one requiring apicoectomy.

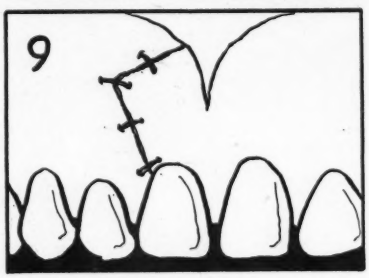
5. In this technique the author no longer makes the incisions to end in the interproximal papillae as shown in the case illustrated (Figs. 10, 11, and 12). When sutured, such an incision does not have as satisfactory adaptation interproximally (Fig. 12) as when the incisions are made to end on the labial aspect of the teeth.

6. When sutured, the gingival border of this type of flap is held snugly against the alveolar crest by passing the suture through the papillae of the flap and carrying the suture around the middle tooth to the lingual and tying it there (Fig. 12). Laterally, each incision usually requires two sutures for proper closure, one at the gingival end and one near the lower end.









6. ***Lines of incision for the flap over central.***

7. ***Flap retracted, apex of root exposed.***

8. ***After resection the edges of the flap will be supported by a surface of bone.***

9. ***Showing where sutures should be placed.***

Method for Completing the Window

With the flap retracted and considerably larger in all dimensions than the intended opening in the alveolar plate of bone, the operator may be guided by two factors in the determination of the proper location of the window:

(1) By the roentgenogram for the probable length of the tooth root, provided the angle of x-ray exposure has been correct. The possibility of elongation or shortening on the film as a result of improper angulation must always be considered. A good roentgenogram is a fairly accurate guide.

(2) With a considerable surface of bone exposed, the operator can often see the elevation of the alveolar plate as it conforms to the underlying root, as well as the shallow depressions on either side that mark the interradicular areas. These two factors will readily suggest the proper location at which to make the opening.

Possibility of Deviation Avoided—Generally speaking, the aperture can be made with either a hand chisel or a bur. In most cases it is advisable to outline the ultimate opening with a hand chisel (Woodward Number 1) and then to do the actual cutting with the bur. The outline made with a chisel serves as a guide for the path of the bur, avoiding the probability of deviation and loss of perspective.

Support for Flap Provided—Although it is immaterial at which point the outline is started, it is advisable to limit the lowest point first of all to ensure a sufficient amount of bone surface between this point and the lowest point of the incision (Fig. 3). The reason for this, as stated previously, is to provide a surface of bone to support the flap when it is finally replaced and sutured.

New Bur Essential—In cases where

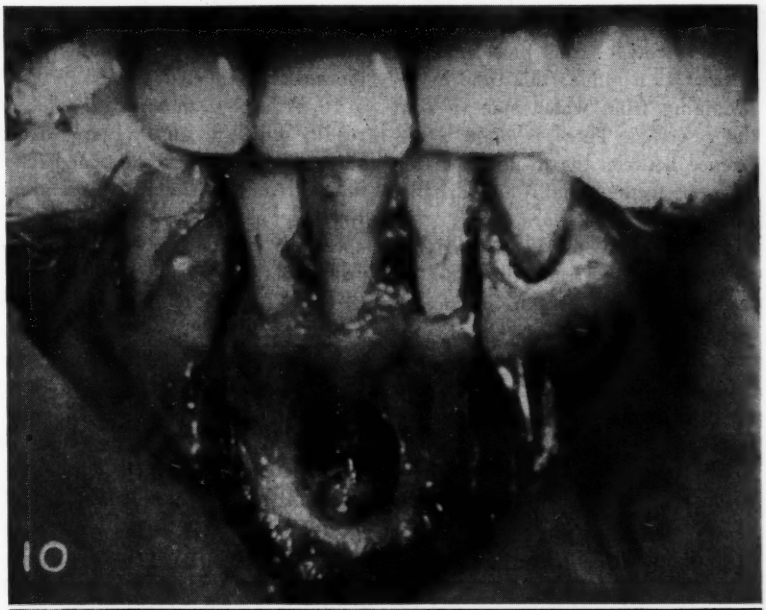
an extensive cyst exists, the alveolar plate may have been so thinned that it would not be advisable to use the chisel at all because of the complete loss of underlying support. Relying on the bur entirely in these cases, the first cut is made with a cross-cut fissure bur Number 701 at the lowest border of the proposed opening. A new bur is essential.

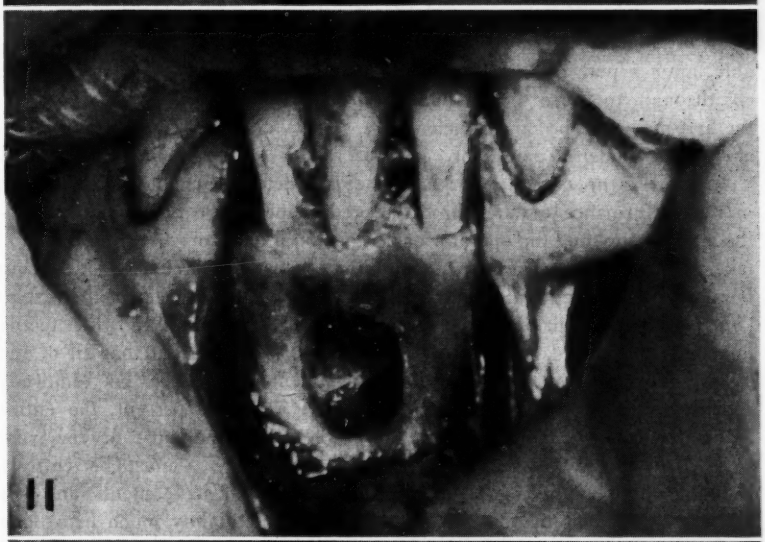
Operating Field Cleared with Sponge or Aspirator—Often, as the bur is carried around to cut out the window, it enters an existing pus sac; pus may exude in varying amount. This may be mopped up with the gauze sponge or the aspirator. The field having been satisfactorily cleared, the operator may proceed to complete the window cutting.

Procedure—1. The circling cut completed, the circumscribed island of bone may be pried out with a spoon-shaped excavator (Darby Perry Number 22 Excavator). With this removed, the periapical area will be in view (Figs. 3 and 10).

2. Not all of the affected periapical area can be expected to be visible; there are times when all that can be seen are the root tip and possibly the attachment of the sac. An extensive rarefaction and its contained infected tissue may extend far out of sight; either up or down, or palatally. That is immaterial, for interest is centered on the visibility of the apical end of the root.

3. After all rarefied tissue is removed, all the invisible spaces can be cleaned out and curetted thoroughly, entirely through tactile sense. It is not necessary to see everything; it is only necessary to know, from a study of the roentgenogram, how extensive is the involvement and to be guided in curettement by this knowledge and tactile sense. The apical part of the tooth exposed, amputation may be performed.





10. ***For a lower incisor a wide flap should be made to include three teeth.***

11. ***After resection the edges of the flap will have good support from underlying bone.***

12. ***Showing where the sutures should be placed for this type of flap.***

Resection

The roentgenogram must again be utilized as a guide; this time in determining from which side to start the resection. There is often a difference between the distances to the adjacent teeth mesially and distally. The following steps are taken:

1. The bur should be inserted and the cut started from the side on which there is a greater distance to the adjacent root, for it is obvious that if the bur is inserted between two roots that are in close proximity the periodontium and root of the adjacent tooth may be injured.

2. The bur with which the amputation is accomplished is the crosscut fissure bur Number 701.

3. If the apex to be amputated is of a lateral incisor only one bur may be necessary but if it is a central incisor or a cuspid, it may be advisable, after a part of the distance is cut through, to use a second bur as the first may have become sufficiently clogged to render it inefficient.

4. There is no necessity for haste in the performance of any phase of the apicoectomy and the operator can take the necessary time to change burs when that is advisable.

5. Cutting through the root is best done in a forward and backward sawing movement at the same time directing slight pressure sidewise across the root.

6. When the second bur has been brought into play, it is placed into the groove created by the first bur and the procedure is continued until the root has been entirely cut through.

7. As the other side of the root is approached in those cases in which the roots are in close proximity it is advisable gradually to apply less and less sidewise pressure so that when the bur finally passes through the root it will not be jammed against the thin partition overlying the adjacent root with possible injury of its periodontium.

8. The removal of the amputated apex is easily accomplished by lifting it out with the college pliers or with a large spoon-shaped excavator or with a curet.

9. On occasion a small granuloma may be so tenaciously attached to the apex that it will come along when the apex is removed.

10. A large granuloma may not so readily oblige because its large outer surface attachment to the bone cavity offers greater resistance to separation. In these cases the freely swinging apex is pulled away from its granuloma.

Curettement

In the curettement that follows the operator must again be guided by a study of the roentgenogram. A granuloma is of irregular shape and so is the bone cavity in which it lies; one conforms to the other. It may extend downward along the root or in fact in any direction from the apex. The labial alveolar plate is often destroyed by the progressive degenerative process with the establishment of a fistula. The same is often true of the palatal surface.

Granulatomous Tissue Removed—A study of the roentgenogram will aid in determining the probable size and shape of the bone cavity. Keeping the film before him, the operator may constantly refer to it during curettement to supplement the revelations of the curet and his tactile sense. It is important that all of the granulomatous tissue be removed; and if a cyst is present, the entire cystic membrane must be removed. The bone cavity must be entirely cleared of all its contents and the curet should lightly touch firm bone throughout. Curets Numbers 85 and 86 (Cleve-Dent) have been found extremely valuable.

Edges of Root May be Rounded—After resection it is sometimes advisable to round the edges of the root although it is not essential to do so. It sometimes happens in resection that the line of cutting leaves the root slightly saucer-shaped and subsequent healing does not fill the bottom of this saucer area with bone. Fibrous tissue fills the area and being radiolucent, presents the radiographic appearance of an unhealed spot. If an operator is concerned with the radiographic appearance that might be misinterpreted at a later date, he may round off the edges of the root with a large round bur. This will ensure a radiographic appearance, after regeneration, of bone snugly adjacent to the resected surface.

Dentinal Tubules Sealed—The next procedure is to seal the dentinal tubuli exposed in the resected surface of the root. This is easily and efficiently done by the application of silver nitrate followed by eugenol.

Reinfection Prevented—(1) With the root end permanently sealed, (2) the main canal sealed in the beginning under considerable pressure, and (3) the sides of the root perfectly covered with an impervious layer of cementum, there cannot possibly be any avenue through which reinfection can be introduced.

Silver Nitrate Applied—Use a saturated bit of cotton only slightly larger than the head of a pin to apply silver nitrate. Such a small pellet can carry, in saturation, all the silver nitrate necessary and will avoid getting the solution on other tissues, limiting its application to the root end only. Cauterizing other tissue will only retard healing.

Bleeding Within Bone Cavity Stimulated—Satisfied that the root end is efficiently sealed, bleeding within the bone cavity is stimulated by a gentle curettement of its sides. It is also well to smooth the edges of the window to make sure that there are no sharp bony projections or spicules left that would irritate the flap. When the bone cavity is entirely filled with blood, the flap is brought down to its proper place and sutured.

Suturing Completed—Usually it is necessary to suture at three points to close the crescent-shaped incision. One suture is placed at the lowest point, which is at the center; and one is placed on each side approximately midway between the central suture and the ends of the incision (Fig. 5).

Adaptation Secured—After suturing is completed, a slight pressure momentarily applied against the flap with a gauze sponge will ensure its proper adaptation. The operation may be considered completed with a final painting of the surface with Talbot's iodine. A convenient needle

to use for suturing in this location is the half-round needle Number 14. The suture thread is catgut .000. The catgut sutures need not be removed and in four or five days will be absorbed.

Instruction to Patient

1. In addition to taking a sedative, the patient is instructed to apply ice packs directly over the area of operation at ten-minute intervals keeping the ice pack on for ten minutes and off for ten minutes alternately for four hours. If swelling does occur it is usually of little consequence and of short duration.

2. It is advisable to make sure that the tooth is not in traumatic occlusion and that any undue pressure exerted upon it by opposing teeth has been relieved by grinding the points of occlusion. Undue pressure during mastication will be avoided by the patient's instinctive reluctance to use an impaired part until regeneration takes place.

Conclusion

It is emphasized that periapical pathology alone is not a valid excuse for extracting an anterior tooth.

154 *Broad Street.*

Pressure Habits. Etiologic Factors in Malocclusion

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Summary

1. Living bone is an ever-changing tissue that is constantly being repaired and replaced from infancy to old age.

2. Living bone is extremely susceptible to the guidance and influence of pressure and stimulus.

3. The extent to which living bone can be changed with pressure or stimulus is controversial. However, even the most conservative group will agree that alveolar bone can be changed and the teeth in that bone regulated with orthodontic treatment (planned, intentional pressure).

4. Abnormal pressure habits (unintentional pressures) also change alveolar bone and regulate teeth in that bone because the bone-building cells on the receiving end of pressure or stimulus cannot differentiate whether that pressure or stimulus is intentional or unintentional.

5. Since changes take place in living bone whether the stimulating factor is intentional or unintentional, abnormal pressure habits cannot be denied as an etiologic factor in malocclusion without rejecting the accepted principle of planned orthodontic treatment.

6. The face, with its cartilaginous bone, yields easily to stimulus and pressure, especially during growth spurts, and presents the most complicated growth problem in the entire skeleton. Since the greatest growth changes in the head are being made by the facial structures, it can be assumed that all abnormal pressures should be kept from this most vulnerable target, the face.

7. It is during the transition from the deciduous to the permanent arch that much damage takes place, and it is during this transition stage that the avoidance of all abnormal pressure habits is of the utmost importance.

8. Some children with abnormal pressure habits have well-developed faces with no malocclusion. How, then, can other children with the same abnormal pressure habits have facial abnormalities? One authority believes that healthy bone grows and is influenced by environmental factors such as abnormal pressure habits. Bone that has a disturbance in ossification caused by ill health, improper diet, or endocrine disturbance, resulting in bone fatigue, does not grow and consequently is not changed by environmental factors such as abnormal pressure habits. By the same token, it may be explained why some patients with malocclusion respond to planned orthodontic treatment while others with the same apparent malocclusion and receiving the same planned orthodontic treatment do not.

9. The etiology of malocclusion is infinitely complex and although abnormal pressure habits are a factor that must be considered in the study of the cause of malocclusion, they are by no means the complete answer to the orthodontist's problem. Dental and facial deformities may be the result of many etiologic factors, such as nutritional factors, hereditary factors, environmental factors, endocrine dysfunctions, premature loss or prolonged retention of deciduous teeth, malformed or supernumerary teeth, loss of permanent teeth, pathologic entities, as well as abnormal pressure habits, all of which may function singly or be superimposed upon each other.

10. Normal habits maintain normal structural form; abnormal habits maintain abnormal structural form.

11. The mechanical orthodontist may have the ability to move teeth but his success in retaining them, preventing a relapse, is not nearly so great as that of the orthodontist who not only is mechanical but also understands the laws and principles of growth and development.

12. The orthodontist and the patient can suffer no possible detrimental effects by eliminating abnormal pressure habits. It is reasonable to eliminate (A) everything that aggravates malocclusion, (B) everything that nullifies the plan of orthodontic treatment, and (C) everything that is a potential factor in causing treated orthodontic cases to relapse.

13. Prevention of malocclusion is a responsibility that must be accepted by the family dentist as well as by the orthodontist.

Adapted from *American Journal of Orthodontics* **38**:586-587 (Aug.) 1952.

Costs and Other Considerations in Operative AIRBRASIVE® TECHNIQUE

R. J. COGGESHALL, D.D.S., Rochelle, Ill.

DIGEST

The author of this article kept a record of the expense of installation and operating an Airdent® machine for the first nineteen months of continuous use in his dental office. These costs, as well as specific considerations concerning the application of the Airbrasive® technique, are presented herein.

Description of Technique

The principles and mechanics of the Airbrasive machine are well understood. Briefly, the procedure is that of cutting tooth substance by the abrasion of fine particles directed in a small well-defined stream under pressure and at great speed which removes tooth structure at the point of contact. Differences in (1) the angulation of the cutting stream, (2) the distances traversed, and (3) in the amounts of pressure behind the stream permit a wide range in results. Knowledge of the basic principles involved and dexterity through practice are the chief requisites to the successful use of this technique.

Operative Skill Perfected by Practice—Because of the simplicity of the principles and mechanics, one day of concentrated competent instruction should be sufficient formal training. The operator can perfect his skill on his own time by using mounted teeth and starting with simple one-surface preparations. As the method for each type of cavity preparation is mastered with a reasonable degree of competence, the technique indicated can be employed in the various types of cavities in patients.

Saving Occasioned by Self-Training—There is no substitute for careful and diligent practice on actual patients and if the operator is doubtful of his ability, practice can be limited to teeth that are about to be extracted. One week of persistent application of this method on patients in the dental schools who are about to have extractions would make the time of formal training required at present, worthwhile. The method described, however, should be sufficient and will save time and money that would otherwise be expended in taking the required course of training. Self-training will effect a saving of several hundred dollars which otherwise must be figured in the original cost of installing the technique.

Cost of Installation

In addition to the educational cost there is a capital outlay of approximately $1,800.00 There is also the expense of the initial months of reduced efficiency in office production. It is estimated that $3,500.00 in time and capital outlay will enable an operator to equal his former degree of operative efficiency. For instance, three months of continuous office use, almost to the exclusion of the conventional handpiece, brought the author of this article up to his former productive level; from that time on it was possible to reduce the operative time on each preparation.

Training Period Varies—Differences in the operating time of dentists make it impossible to evaluate the amount of practice time necessary to attain maximum efficiency. It can be assumed, however, that a normally slow operator will be less conscious of the early period of inefficiency.

Aids to Reduction of Operating Time—Employing a chair assistant greatly reduces operating time as the handpiece can be placed in the hand or taken away without thought or effort on the part of the operator. The rubber dam is seldom used nor is it necessary.

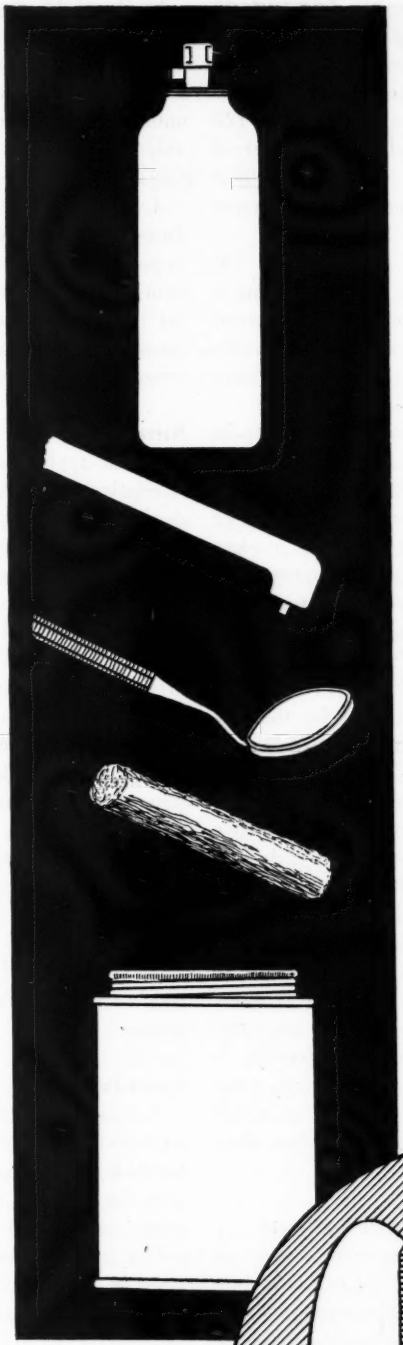
Materials Used—Cotton rolls are used and in the case of interproximal preparations a piece of stainless steel matrix is placed between the teeth to protect the adjacent tooth from reflected abrasive action. The complete cutting of outline form, paralleling of walls, and leveling of floors not involved with caries is done with the Airbrasive instrument.

Relative Time Employed in Operative Procedures

The actual cutting time for Class II cavities is two to three minutes. The outline form can be cut on Class III cavities in less than one minute. The cutting operation on as many as five Class III cavities can easily be accomplished in less than five minutes.

Hand Instrument Employed—(1) The removal of caries, (2) the use of zinc phosphate and eugenol base where indicated, (3) the beveling of margins and the gingival floor are all operations done with hand instruments, except in the case of inlay preparations where a sandpaper disc is used on the proximal margins.

Removal of Metallic Restorations—The operator should first test the cutting speed on the metallic substance; if slow because of softness, he should resort to the rotary drill for its removal. As nearly as can be estimated, the use of the conventional



30 TANKS CO_2

+

5 AIRDENT NOZZLES

+

20 MIRRORS

+

12000 COTTON ROLLS

+

19 CANS #4 ABRASIVE

$97.50

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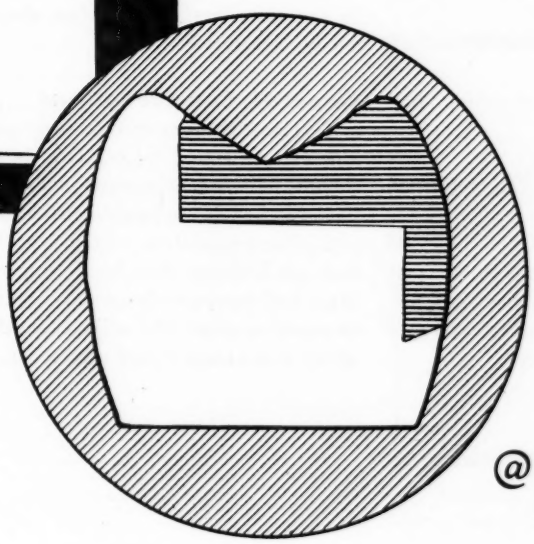
$256.60

Expense of Airbrasive Procedure in Cavity Preparation



= **5660** ***Cavity Surfaces***

@ **.045** ***per surface***

rotary instrument consumes less than 5 per cent of the actual cutting time; in the majority of typical preparations it is not necessary to use the rotary instrument.

Rapid Techniques—Retention points for foil, silicates, acrylics, and amalgams are placed last; the time required for these procedures is negligible as it is for retention points for pinledge inlays. Retention grooves for three-quarter crowns can be cut rapidly and accurately. Crown preparations are much slower and require more extensive use of rotary instruments although the preliminary removal of enamel for jacket crowns is rapidly accomplished.

Cost of Materials Used

In order to systematize the records kept for the purpose of determining the cost of materials consumed in operation, cavities were classified according to the surfaces involved inasmuch as a single surface required about the same time, regardless of location. A Class III was either a (d) distal, or (m) mesial; a Class II was either a (mo) or a (do). Records were kept on the number of areas prepared during the use of each of 30 tanks of the propellant gas (CO_2).

Amounts Recorded—Records of materials used included mirrors, cotton rolls, the number of containers of abrasive, and Airdent nozzle tips. The numbers used were the following:

5 Airdent nozzles

12,000 cotton rolls

19 Number 4 cans of cutting abrasive

Total Costs—Cost of the total supplies used, including CO_2, was $256.60. Cavity surfaces prepared totalled 5,660. This was an average of 182 surfaces per tank of gas. Operating cost in materials averaged $.045 per tooth surface.

Operative Speed Increases with Practice

In the author's experience, the first two tanks of carbon dioxide permitted the completion of 103 and 121 surfaces respectively; the number of surfaces per tank multiplied rapidly with experience and greater operator dexterity.

Increasing the pressure to 100 pounds per square inch and using a heavier abrasive mixture heightened the speed of cutting and apparently used less of the gas and the abrasive powder.

Normal Efficiency Reached—In the author's case normal operating efficiency was reached after the third month of continuous use; it was then possible to surpass previous productive efficiency with the conventional handpiece. The use of local anesthesia was negligible compared to previous use.

Difficulties Overcome—The records reported here were kept for the first nineteen months of continuous use in personal practice and refer only to cavity preparation. The period of transition from rotary to Airbrasive technique is the source of early discouragement for the operator because of the lack of skill in the beginning and the necessity for concentrated use of the eyes. Direct vision, which is so important, produces strain in body position. These conditions are overcome by practice; less tension is noted than that experienced when using the conventional method, which is sometimes resorted to when absolutely necessary.

General Considerations

1. The Airbrasive method does not readily cut active caries. This is a definite advantage because inadvertent exposure of the pulp is avoided.

2. The temperature of the propellant gas is lower than body temperature and consequently produces pain in sensitive areas. The original shock of the lower temperature rapidly subsides, however, according to patient reaction.

3. The machine is not readily moved from room to room but the author does not consider it objectionably large and uses it in a fully equipped room measuring 8 feet by 10 feet.

4. Use of rotary instruments is reduced to a minimum and the technique is favorably accepted by patients who consider it much less painful than the dental handpiece with its accompanying vibrations, sounds, pressure, and generated heat.

Summary

1. The application of the technique is relatively simple. Its successful use depends primarily upon the operator's determination to persist in the early transitional period rather than on postgraduate training.

2. The required one to two-week course and capital outlay are major deterents from general acceptance by operators.

3. The initial transitional period is taxing. Normal efficiency can be attained in a few months of practical application.

4. Operating maintenance costs are low per unit of cavity preparation; namely, four and one-half cents per surface.

5. The use of the rotary drill can be virtually eliminated in cavity preparation.

Conclusion

A clear understanding of what the equipment can do and a well-formulated idea of the result desired, leaves only the problem of developing adequate skill. This qualification involves the personal potential and is possible to any operator with good vision, a steady hand, and the desire to acquire a technique capable of meeting the requirements of approved preparation form with a minimum of tension for operator and patient.

Medical-Dental Building.

The TUBE IMPRESSION

CHARLES JAY MILLER, D.D.S., Pittsburgh

DIGEST

This article presents a simple step-by-step technique for completing one of the most important procedures in restorative dentistry, a method of making an accurate tube impression which has been developed by the author.

Important Step in Restorative Dentistry

The tube impression is one of the most important steps of procedure in present-day restorative dentistry. The success or failure of an inlay, bridge, jacket crown, or abutment for a partial denture depends on a successful impression. A visit to any dental laboratory, however, where hundreds of dies that have been fabricated from tube impressions carelessly taken without reference to method, makes it easy to understand many of the dental failures encountered in daily practice.

Procedure Uncomplicated — The requirements for an accurate tube impression are (1) thoughtful planning, (2) devotion to the task, and (3) a definite step-by-step procedure. A working knowledge of dental morphology, histology, anatomy, and a thorough understanding of the supporting gingival structures are demanded.

Object of Precise Technique—One of the basic reasons for a precise technique for the tube impression is that of preserving the attachment of the periodontal fibers. According to Tylman,[1] "the function of the periodontal membrane is such that it has been called the foundation of all restorative dentistry." Great care must be taken not to lacerate these delicate fibers and attachments. Beube[2] claims that reattachment is possible. Whether or not this is true, it is advisable to avoid the possibility of traumatizing these tissues and fibers by employing an exact technique.

Procedure

Selecting the Copper Band—The first step in the tube impression is that of selecting a copper band the proper size for the prepared tooth. If the band is too large, severe damage to the gingival tissues and an inaccurate impression will result; if it is too small, it will be impossible to secure an accurate impression of the preparation.

Aid to Selection of Band—It is advisable to keep a supply of copper bands in a Moyco chest to facilitate selection. Note that the numbered band fits its corresponding lug; the band should fit the prepared tooth in the same way with a certain amount of frictional resistance. The correct size of band may be determined with a dentometer wire[3] fitted first to the tooth and then to its projection of the proper size on the box. Gillett and Irving[4] point out the dangers of using an unannealed band because of its springiness which may compress and distort the compound. By heating the band to a cherry red (Fig.1) and then plunging it into alcohol or water (Fig. 2) to preserve the bright copper color, the band becomes annealed and is rendered soft, ductile, and more easily handled.

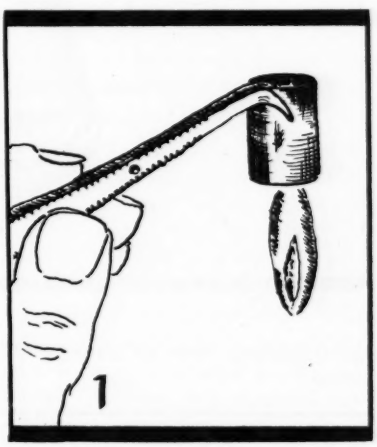
Improvised Instrument — Indispensable in this type of work is a modified Backhaus towel clamp, suggested by I. Franklin Miller. It is modified by grinding off the ratchet and adjusting the points so that they overlap.

Tube Impression Technique

1. A hole is punched with the Backhaus clamp to indicate the labial or buccal surface and near the occlusal or incisal third (Fig. 3).

2. Place the annealed band upon the tooth and trim and festoon the gingival border to correspond with the gingival margin (Fig. 4). File the festooned edge so as not to lacerate the delicate gingival tissue when repositioning the band (Fig. 5).

3. Fill the band with softened bench or carding wax and take the



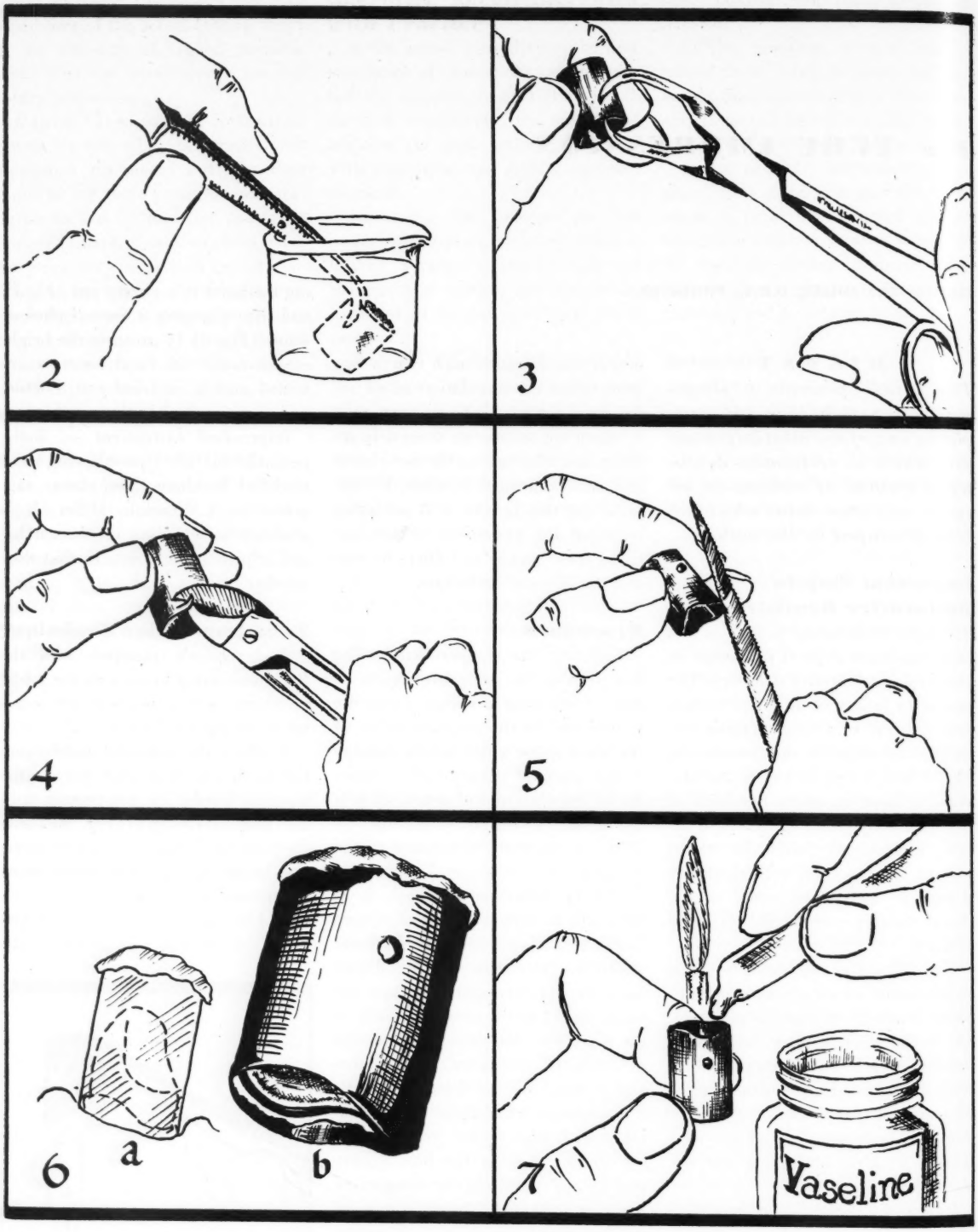
1. ***Annealing copper band. Heat to cherry red.***

[1]Tylman, S. D.: Theory and Practice of Crown and Bridge Prosthesis, St. Louis, C. V. Mosby Company, 1940, Chapter 23.

[2]Beube, F. E.: A Radiographic and Histologic Study on Reattachment, J. Periodontology **23**:158 (July) 1952.

[3]Brecker, S. C.: The Porcelain Jacket Crown, St. Louis, C. V. Mosby Company, 1951, Chapter 6.

[4]Gillett, Henry W., and Irving, Albert John: Gold Inlay by the Indirect Method, D. Items Interest, **53**:419-420 (June) 1932.



2. ***Quenching band in water or alcohol.***

3. ***Punching labial or buccal hole with towel clamp.***

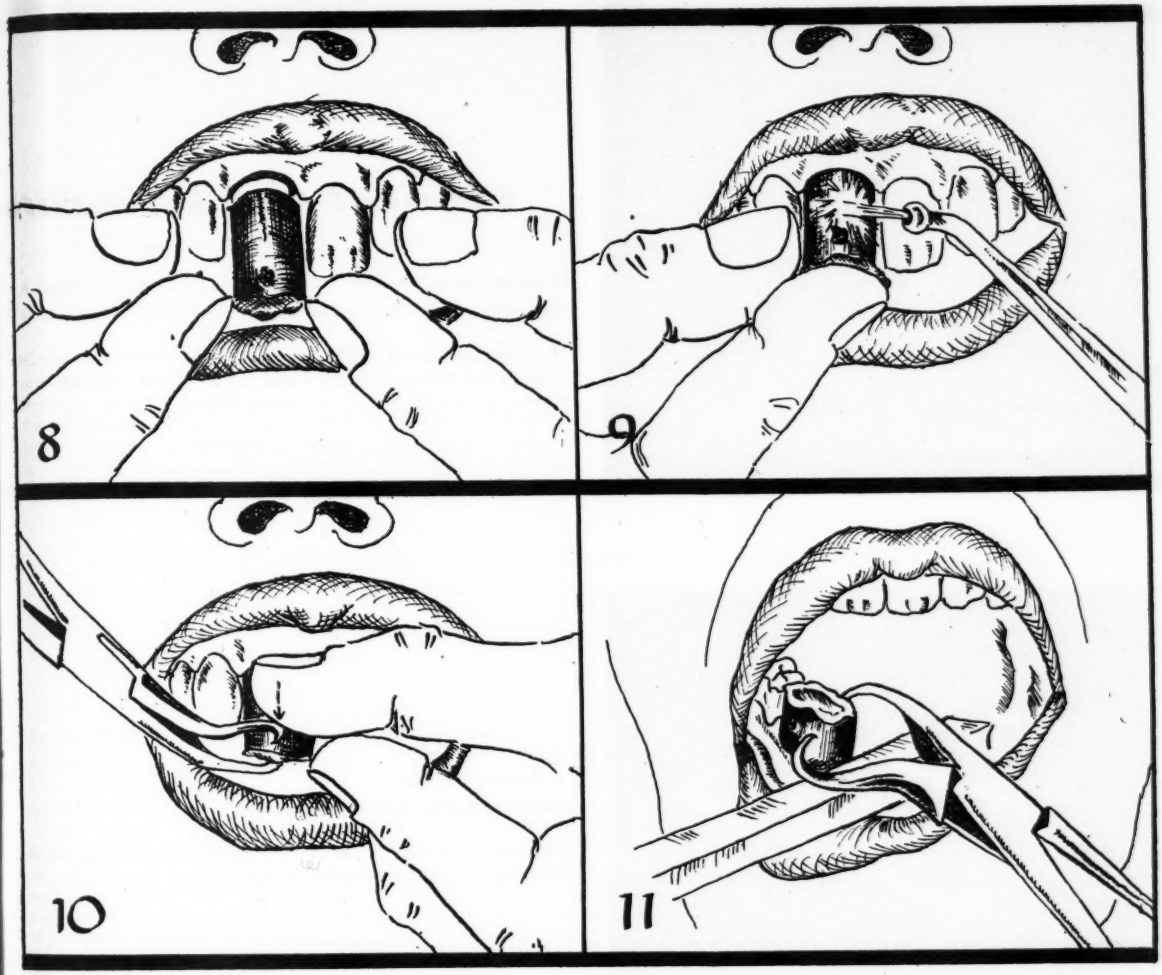
4. ***Gross festooning of band.***

5. ***Filing burs or rough edges.***

6. ***(a) Preliminary impression. (b) Close-up showing overextension.***

7. ***Use of dry heat for softening the compound.***

preliminary impression (Fig. 6a). This will serve to reveal any undercuts or flaws in the preparation and enable the operator to festoon the band with extreme accuracy as shown in Figure 6b.



8. ***Method of seating the compound; loaded band.***
9. ***Chilling the impression.***
10. ***Method of removal of the maxillary tube impression.***
11. ***Method of removal of the mandibular tube impression.***

4. Melt out the soft wax and burn out any remaining wax; the band is now ready for the final impression.

Method for Use of Compound—1. Tracing stick compound is the most convenient form to use. This should be a high fusing compound that will fracture readily if undercuts are present. The compound may be softened in hot water or in an open flame (Fig. 7). The open flame method is more desirable as it prevents the band from pulling away from the compound. Lubricate the fingers with vaseline to protect them from the heat of the flame.

2. Lubricate the tooth thoroughly with a good die lubricant; apply the lubricant lightly but with a burnishing method to remove all shavings and tooth debris.

3. Fill the band with softened compound, carry to the tooth, and carefully place the band in position by placing the fingernails on the periphery of the band (Fig. 8), and carrying the band to place.

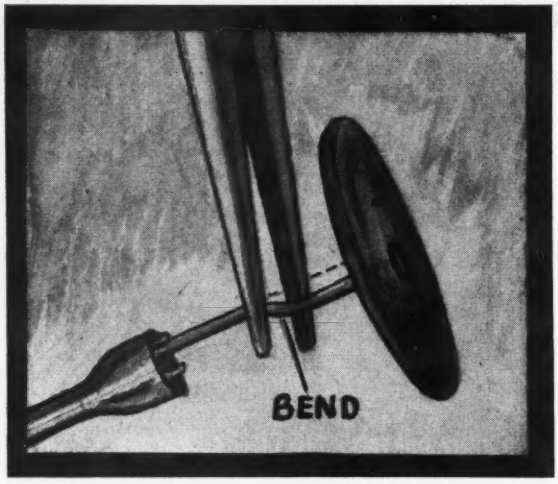
4. As soon as the band can be felt over the shoulder or margin of the preparation, compress the extruded compound into the band with the ball of the index finger, taking care not to push the band any farther gingivally.

5. After the compound has begun to harden, chill with cold tap water for thirty seconds and allow another thirty seconds for the compound to harden completely (Fig. 9).

Removing the Band—The band is removed with one straight, definite pull. Do not tease or try to remove the band in any other way; the only result of this will be a distorted impression.

Removing the Impression—The most satisfactory way to remove the impression is illustrated in Figures 10 and 11. After removing the impression, examine it carefully; if satisfactory it can now be used to produce an accurate copper-plated die.

Medical Arts Building.



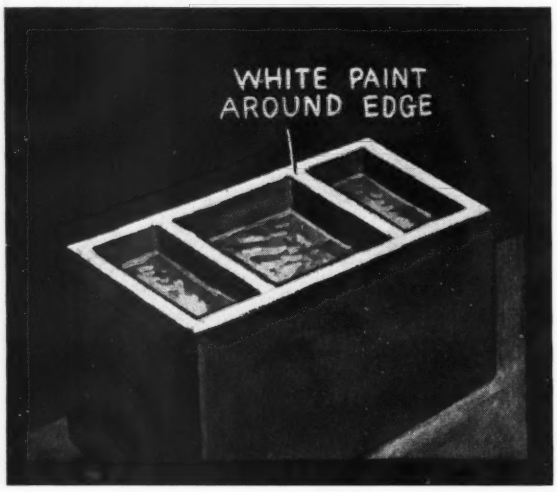
1

Clinical and Laborato

Tightening a Mandrel

Bernard A. Widen, D.D.S., Chicago

1. Bend the shank of the removable portion of the mandrel to tighten and thus to hold the sandpaper disc more securely.

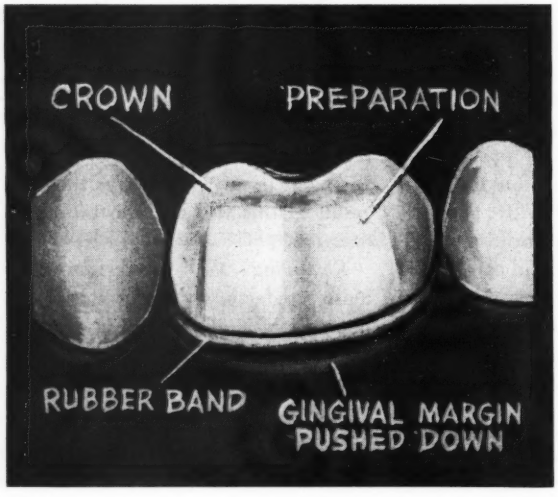


2

A Darkroom Aid

Everett T. Nealey, D.D.S., Exeter, N.H.

2. Paint the top edges of the developing tank white so the outline will show up better under the safe light.



3

Hydrocolloid Impression Packings

D. R. Daniels, D.D.S., Gilmer, Texas

3. To secure more accurate impressions of tooth preparations when using the hydrocolloid technique, slip a rubber orthodontia band around the neck of the tooth to force the tissue away from the margins of the preparations. Remove the rubber band immediately before the injection of the hydrocolloid.

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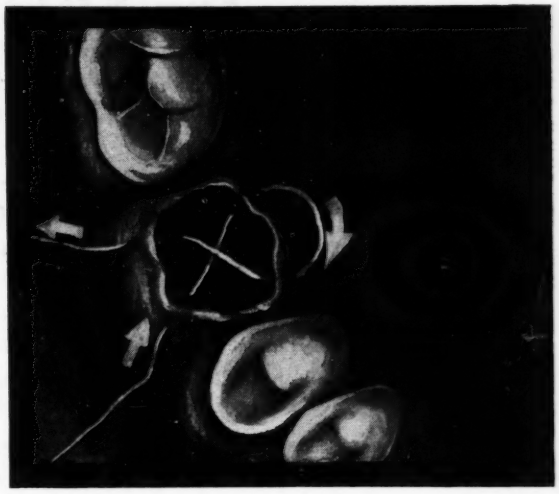
SUGGESTIONS . . .

A Suture Technique

Stanley C. Chun, D.D.S., Sacramento, Calif.

4. A modified mattress suture is used to approximate the edges of extraction wounds and to retain a dressing. The needle is inserted at the mesiobuccal margin of the wound, then crossed to the distolingual, reinserted in the mesiolingual, and crossed and brought out on the distobuccal margin. The ends are then tied in the usual manner.



4

Acrylic Coping for Full Crown Preparation

Samuel Bogdonoff, D.D.S., Washington, D.C.

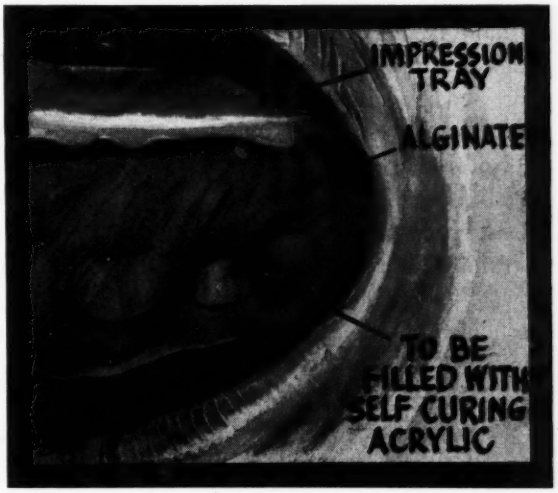
5. After taking a band impression of the full crown preparation, select a suitable resin crown form and drill a hole in the form. Lubricate the tooth. Fill the resin form with self-curing acrylic and carry to place on the preparation. Some of the acrylic will be forced through the hole in the crown form to act as retention in the plaster impression. The metal die is fitted in the acrylic impression.

5

Construction of a Full Cast Crown

Kenneth Clond, D.D.S., Muskogee, Okla.

6. Take a full alginate impression. Prepare the tooth for the crown. Coat the preparation with light oil. Fill the alginate impression of the tooth that has been prepared with a self-curing acrylic. Reseat the full alginate impression and hold in place for ten minutes. Remove the plastic crown from the alginate impression and cast in gold. The crown produced is an exact reproduction of the original tooth.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 184 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

WITH THE possible exception of fluoridation of community water supplies as an adjunct to caries control, no subject is as controversial in dental circles as is the theory of focal infection. Both the antiquarians and the modernists can cite example after example to prove their points of view. The medical historian presents evidence that a 2600-year-old letter addressed to a king of Assyria proves that 600 years before Christ medical men were aware of relationships between local and general disease.[1]

Here is one of the translations made from the fragments of the cuneiform tablets of Assyria:

" . . . Replying to what the king my lord wrote me, 'Send (me) your true diagnosis.' I have given (my) diagnosis to the king my lord (in one word): 'Inflammation!' He whose head, hands and feet are inflamed, owes his state to his teeth: his teeth should be extracted. On this account (his) insides are inflamed. The pain will presently subside (the condition) will be most satisfactory."

Coming down to the past century, Koecker[2] in 1843 wrote:

"During a practice of upwards of thirty years I have been more and more convinced of the various and powerful injurious influence and morbid effects which the disorders of the teeth and their adjacent parts exert over the whole animal economy, and I have in all my writing on Dental Surgery, as well as in my practice, endeavored to prove this fact so important to mankind, but still I have to lament that it is not yet sufficiently known."

The modern concept of focal infection of dental origin owes its impact to an English physician, William Hunter, and to an American physician, Frank Billings. The years were 1910-1912. Hunter[3] expressed himself on the subject with more dramatic vigor than with scientific objectivity:

"No one has more reason to appreciate the ghastly tragedies of oral sepsis which his [the dentist's] misplaced ingenuity so often carries in its train. Gold fillings, gold caps, gold bridges, gold crowns, fixed dentures built in on and around diseased teeth, form a veritable mausoleum of gold over a mass of sepsis to which there is no parallel in the whole realm of medicine or surgery."

The greater share of the emphasis forty years ago, as well as today, has been on the diseased pulpal and periapical tissue as focal areas of infection. A few courageous dentists and an inconsequential number of physicians have tried to be heard when they pointed out that the *supporting* soft and hard tissues are also subject to the laws of inflammation and infection and should be considered as possible foci of infection.

It is encouraging, therefore, to find an outstanding physician and a former associate of Frank Billings writing on the subject of focal infection and recognizing that supporting tissue lesions must be considered when an evaluation of focal infection is being made.

This physician, Coleman,[4] writes:

"Gingival and periodontal lesions are now regarded as a manifestation of both local and systemic disorders. They represent a borderline region that has been almost entirely neglected by physicians and given very little attention by the average dentist. Lesions of this type should be suspected and searched for. Klock and Kovnat are of the opinion that the cooperation of physician and dentist in the recognition and treatment of gingival disease will aid in the eradication of many systemic ailments . . . Today the emphasis is no longer on microorganisms and on drugs and vaccines to counteract them, but on oral hygiene. Cleanliness and freedom from irritation of the periodontal structures, maximum local vigor of these tissues, and optimal general health and nutrition of the individual as a whole are the principal measures to this end."

Unlike some dentists and physicians who have in recent years renounced and ignored the concept of focal infection, Doctor Coleman states with commendable directness: "After much controversy and as a consequence of continued research a clinical study by physicians, dentists, and other scientists, the concept of focal infection has become an accepted principle in the practice of medicine and dentistry." We might add with the same kind of vigor that any dentist or physician who ignores this *principle* of pathology in his practice should be suspected of gross incompetence and colossal biologic ignorance.

[1]Solis-Cohen, Myer: Relationship Between Local and General Diseases, Bull. Hist. Med. **26**:526 (Nov.-Dec.) 1952.

[2]Ibid., page 527.

[3]Coleman, George H.: Present Status of Concept of Focal Infection, JAMA **151**:281 (Jan. 24) 1953.

[4]Ibid., page 282.

MEDICINE *and the Biologic Sciences*

New Tuberculosis Cure

Once again a new drug has been announced to the public as a "new cure." This time it is the drug, isonicotinic acid, which is being advocated for treatment in tuberculosis.

It is difficult to answer questions that patients might ask because so little has appeared in medical literature about this drug.

Recently several drug companies compared notes and found that they had all been concentrating on the same drug—one that has been available for a long time. It was noted that the drug will stop the growth of tubercle bacilli in the test tube. Theoretically, then, it should be the cure that medicine has desired so long. However, the numerous problems encountered in the use of the drug in human beings have not been solved.

It is known that the preparation is easy to take. It has caused no serious toxic effects. Good results have been observed but no rapid and miraculous cures. Isonicotinic acid however seems to be helpful in combating the disease. The largest group of cases, treated at the Sea View Hospital on Staten Island, has been under observation for only a few months. This is too short a time for the appraisal of treatment for an extremely chronic disease.

The action of the drug appears to be brief. Therefore, the plan at present is to use it with streptomycin. It is hoped that the drug will be better than PAS, which up to now has been used with streptomycin. It is obvious that the drug is much more comfortable to take than is PAS, which many patients have been refusing to take. A great advantage of giving isonicotinic acid with streptomycin is that the dosage of the antibiotic can be so low that treatment can be kept up for a year and more without injury to the ears.

The new drug has to be approved by the Food and Drug Administration before it can be prescribed by physicians everywhere. In the meantime doctors will have to refute the idea prevalent among patients that they can now refuse collapse therapy and go right back to work.

Alvarez, Walter C.: Tuberculosis "Cure," Time Needed for Appraisal, Mod. Med. **20**:69-70 (*April* 1) 1952.

The Diabetic Diet

Some clinicians are prescribing a more liberal regimen in the control of diabetic patients. Dependence on urine examinations for control is not the ideal method whether the patient is taking insulin or is merely on a diet. Little specific information is gained in evaluating any particular blood sugar level. The significant factor is determination of how many hours out of twenty-four the level is normal.

Even a healthy person has some postprandial hyperglycemia which is physiologic and of short duration. It usually lasts one and one-half to two hours after meals, up to 25 per cent of each twenty-four hours. This is the criterion for evaluating diabetic control.

If a diabetic patient is hyperglycemic 25 to 30 per cent of each day, control is satisfactory. If the high glucose concentration lasts 50 per cent of the day, readjustment of the insulin dosage is necessary. The practical reason for making three blood sugar tests a day, one before each meal, is to ascertain if the bloodstream is clear of excess sugar before the next meal.

Diabetes can be well controlled with a liberal diet. Such regulation eliminates the feeling of sacrifices and consequent psychologic stress, permitting greater happiness and achievement.

A patient can eat whatever is served the rest of the family if he does not take sugar, pastry, and soft drinks. Also he must restrict his bread to two slices or less a meal, omit bread if he eats potatoes, and for dessert use fresh or canned fruit without sugar or cheese and crackers.

The diabetic patient must eat with moderation and watch his weight. If he gains he must cut down on eating. Once a week a helping of ordinary ice cream without sauce helps to satisfy the craving for sweets.

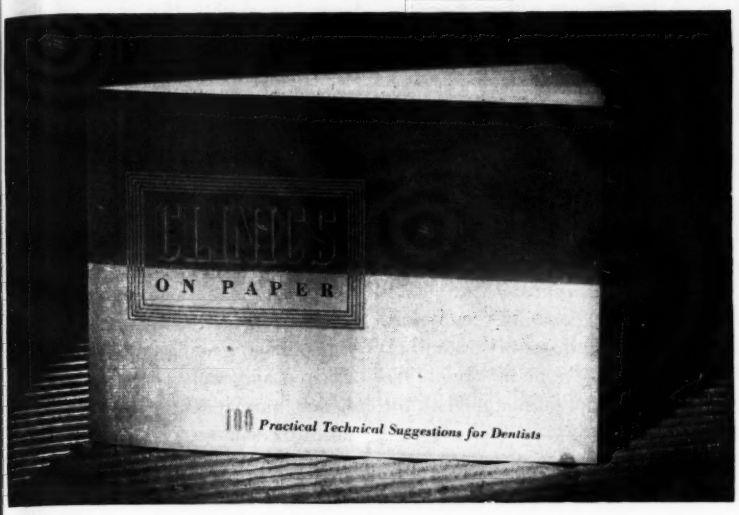
Such a dietary routine is simple, and the patient no longer feels different from the rest of the family. He eats what they do but learns moderation.

The patient should not think constantly about the things he is not supposed to eat. Such thoughts create a tremendous craving for the forbidden food which sooner or later leads the patient to break restrictions. The psychologic aspect of this thought pattern is too important to disregard.

John, Henry J.: Liberal Diets for Diabetic Patients, Ann. Int. Med. **35**:1318-1328 (*December*) 1951.

Irradiation Dermatitis of the Hands

Physicians, dentists, and radiation technicians are among the patients with irradiation dermatitis. Carelessness and disregard of known precautionary measures are all too often responsible for irradiation burns among



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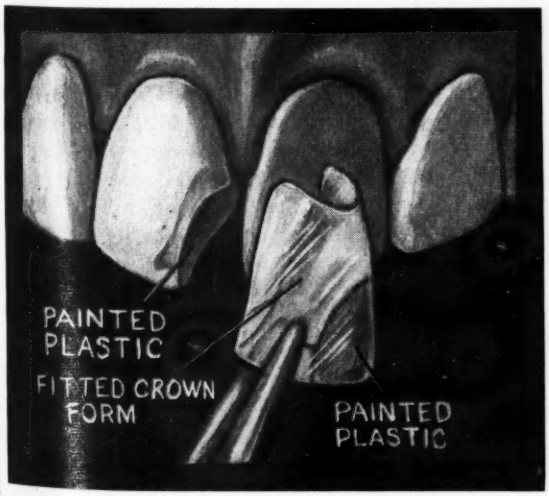

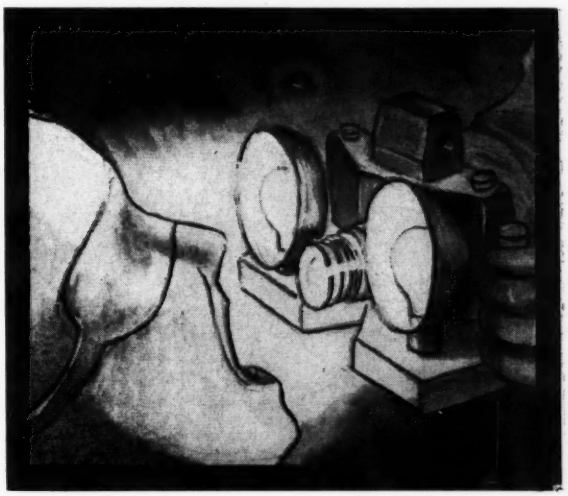

persons who work with x-ray machines or radioactive material.

In most instances, the lesion results from repeated minimal exposures. The occasional roentgenologist, the busy general surgeon, or the general practitioner who uses a machine in his practice frequently neglects to take the required precautions. A doctor often knowingly exposes himself to irradiation during diagnostic fluoroscopy, or while setting fractures or looking for foreign bodies.

The most important aspect of irradiation dermatitis is prevention. Few of the patients with radionecrosis of the hands have had conditions necessitating radiation. Since the skin of the hands is particularly sensitive to exposure, and chronic and recurring skin diseases are rarely cured by roentgen-ray treatment, the use of irradiation in such cases is illogical. Tumors and infections of the hands are also best treated by other means.

Patients with chronic skin disorders are also commonly subjected to repeated small doses of irradiation. If such persons remain under the care of a single dermatologist, the danger is slight. However, another physician who has no knowledge of the patient's previous therapy is often consulted after a recurrence and additional roentgen treatment may be given.

At times, a patient's hand is injured during a relatively short period of time, as from improperly working x-ray apparatus or during fluoroscopy. Other patients have radionecrosis from destructive irradiation. Sometimes a malignant tumor is destroyed and replaced by a dermatitis which may itself be cancerous. The use of roentgen rays for depilatory purposes or for treating infection may cause radiation dermatitis.

Pathologically, the condition resembles an acute burn. However, the chronic changes are distinctive. The irradiation interferes with the cutaneous blood supply, making the skin dry and inelastic, and exerts a carcinogenic effect of the epithelial cells. Ulceration, chronic infection, and carcinoma may ensue.

The treatment of chronic irradiation dermatitis on the hand consists of excision of the damaged skin. If the condition is allowed to progress infection becomes firmly established ulcerating and frequently malignant lesions develop.

The carcinomas which develop in cases of irradiation dermatitis are almost always the low-grade squamous cell type. Local excision is usually adequate. If the subcutaneous tissues and bone are involved, amputation of the affected part is necessary. Without palpable nodes, lymph node dissection is probably not required.

Mason, Michael L.: Irradiation Dermatitis of the Hands, Am. Surgeon **17**:1121-1131 (*December*) 1951.

Pain in the Aged

Of all presenting symptoms pain is the chief reason for seeking medical advice. Often the factors associated with pain are baffling and discouraging.

Many of the pain-producing de-

rangements to which human flesh is heir can be neither abolished nor evaded. The sole value of pain lies in warning the subject of harmful intrinsic or extrinsic factors threatening his comfort and well-being. Unfortunately, pain often continues long after this function is accomplished. Once its protective purpose is exceeded pain may become definitely destructive.

In dealing with pain the problem is to determine its origin and to remove its cause. If removal of the cause is not immediately possible temporary relief must be instituted until control of the cause is accomplished. The etiology may be unknown or an accurate diagnosis may reveal that the immediate or even remote removal of the causative factors may be impossible. This demands that the pain be subdued.

The use of analgesic and hypnotic drugs is logical and justifiable within reason but there is danger that prolonged use may burden the patient with an additional affliction. Drug dependence may obscure the real disease further by diminishing the patient's awareness or by his acquired preference for addiction.

The conquest of pain is essentially the same in all age groups with one possible exception. The outlook of the geriatric patient may be such that surgical relief is refused when possible, or his physical status may present a risk sufficiently serious to preclude operation. Trigeminal neuralgia, more frequent in older persons, is a case in point. Its recurrent excruciating attacks can be alleviated by gasserian ganglionectomy. However, if surgery is not elected, excellent control is possible by blocking the ganglion or any of the offending branches with procaine-alcohol. Periodic reblocking is usually required, with intervals of several months of complete relief from pain. Blocking the nerve itself is more satisfactory than local injection of the hyperalgesic point which may effect only temporary relief.

Any number of conditions may cause severe pain in the elderly. Many of the conditions are chronic. Therefore, the pain may be continuous.

Several types of nerve block have been employed to relieve pain in many of these conditions. There is a high percentage of success when good judgment and surgical skill are available.

Patients doomed to suffer from inoperable malignancy deserve great consideration. Unfortunately, this is an extremely difficult group to treat with nerve block therapy. The real and not always surmountable problems are: (1) extensive involvement, (2) metastases, (3) difficulty of pain localization, (4) anatomic distortions, and (5) the attempt at a chemical destruction of sensory nerve fibers without disturbance of motor function.

Involvement of sensory areas of the head, neck, and extremities may often be attacked successfully. Chest pains respond less favorably, but some degree of relief is possible in most cases. Pain from neoplasms in the abdominal areas is not always amenable to relief, although pain from pelvic disease can be attacked if the affected area is not too extensive.

Burdick, Donald L.: Therapeutic Nerve Block in Pain Syndrome of the Aged, Geriatrics **7**:93-98 (*March-April*) 1952.

Rx *Sigmoidoscopy—Value*

Physicians and cancer prevention clinics examine an increasing number of persons each year. These yearly examinations provide an opportunity for a thorough investigation of the patient. Occasionally the examination reveals unsuspected conditions which have produced no symptoms as yet.

No such examination can be considered complete without sigmoidoscopy. Unfortunately, not all cancer detection centers perform sigmoidoscopies routinely. Yet the procedure to examine the rectum and lower bowel is just as important as any of the other examinations. The lower bowel is said to be ignored in routine physical examinations more frequently than any other easily accessible region of the body.

The need for sigmoidoscopy is especially evident when one realizes that carcinoma of the large intestine is the second most frequent malignancy in males and the fourth most frequent in females. About 80 per cent of intestinal cancers occur in the rectum or sigmoid and 90 per cent of these are visible by the sigmoidoscope.

In many tumors, especially in the lower rectal segment, barium enema roentgenograms are often unrevealing and misleading. It is unfortunate that many physicians rely mainly on radiography in order to find or exclude lesions of the lower bowel.

Most cancerphobic or nervous patients are grateful to the doctor for a sigmoidoscopy, especially when he can report no abnormality. Thus the physician's attitude is most important. As he perfects himself in the technique, he learns that sigmoidoscopy can be done in a relatively short time, and with hardly any discomfort to the patient. His reluctance to suggest the examination will diminish once he sees how much information is ob-

tained. It is possible to detect unsuspected sources of bleeding such as (1) polyps, (2) hemorrhoids, (3) ulcerative colitis, and (4) malignancies. Also painful or annoying conditions as (1) fissures, (2) fistulas, (3) anal sinuses, (4) hypertrophied papillae, and (5) cryptitis can be treated to better advantage.

About 20 per cent of persons 60 or older have adenomas of the large bowel. Many observers believe that cancer of the bowel often develops on the basis of adenomas. Thus, about one out of every ten patients examined routinely by sigmoidoscopy has premalignant lesions. One cannot stress too much the importance of removing adenomas of the lower bowel as a safe and certain means of preventing carcinoma.

Cornell, Albert: *Value of Routine Sigmoidoscopy, Modern Med.* **20**:78 (*May* 15) 1952.

Bone Grafts

In orthopedic surgery preserved bone grafts should not be considered as universal substitutes for autogenous material but only as useful aids. In general, the use of bone bank grafts should be reserved for circumstances in which autogenous bone is not feasible or advisable.

Four general conditions warrant the use of bone bank grafts: (1) When the available supply of autogenous bone does not fulfill the particular requirements. (2) When the taking of an autogenous graft has not been planned or will materially increase the hazard of the operative procedure. (3) When the graft might be lost because of infection. (4) When the bank bone is used as an internal splint and the condition does not justify the taking of an autogonous graft.

With merthiolate-preserved bone the process of fixation and replacement is definitely slower than with autogenous pieces. This entails prolonged protection and a higher percentage of failures. Probably some of the cells of the autogenous graft are capable of survival and accelerate union when host capillaries reach the graft. The merthiolate bone bank is an extremely satisfactory method of preserving bone. It is more economical than conservation by freezing.

Ribs from thoracotomies and thoracoplasties, and bone from clean amputations and selected autopsies are surgically debrided in the operating room and cut into convenient shapes. The bone is then placed in a sterile jar and covered with a 1:1,000 solution of aqueous merthiolate.

The jar is sealed and stored in an ordinary icebox or cabinet. The solution is changed every two weeks. The bone is briefly washed in sterile saline solution before use.

All types of bone give better results if only small or moderate quantities are used. Homegenous grafts should never be used in the treatment of major nonunion unless autogenous bone cannot be procured. Very few such grafts unite solidly and then only after a prolonged period.

Malignant degeneration of a tumor, continued activity of a bone cyst or infection will prevent solid fusion of a homogenous bone graft. On the

other hand, homogenous grafts are rapidly incorporated with solid union in certain fresh fractures where extra bone appears useful as a splint.

Reynolds, Fred C.; Oliver, David R.; and Ramsey, Robert: Clinical Evaluation of the Merthiolate Bone Bank and Homogenous Bone Grafts, J. Bone & Joint Surg. **33**-A:873-883 (*December*) 1951.

Contra-Angles

Just Peanuts!

An enterprising businessman added salt to roasted peanuts while they were still in the shell. He built himself a quick and, I presume, profitable business. The product satisfied the desire of many people who like to eat their peanuts with the pleasant champing accompaniment of crackling shells. It also satisfied the taste of the regular salted peanut addicts.

How well is the new product selling? I have no marketing report figures and I have had no direct word from the people in this new industry. My guess, however, built on fragmentary research, would suggest that the business may be falling off. This opinion is based on what I would consider to be a reduction in the quality of the product. The newer peanuts are smaller, are not roasted as crisply, the salt seems to have lost its pungency. It could be that this wide-sweeping generalization is being made from one poor batch of the product or it could be made on a day when this investigator's gustatory equipment was slightly out of commission.

Suppose, though, that the salt-in-the-shell peanut has lost some of its quality. The question is: does this represent a trend that frequently follows commercial success? I believe that it does. When a person pioneers

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 174 *and* 175)

Form to be Used by Contributors To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

_____

Subject: _____

_____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

to develop something, whether a salted peanut in the shell or a denture technique, he is inclined to pour a generous amount of his energy into the product during the time when he is struggling for its acceptance. He realizes that inertia, indifference, and hostility must be overcome to have his idea or product accepted. People are generally against anything that is new, and if not actually against, they are skeptical. People have to be sold on new things. They must be convinced that the new product or technique is better, much better, than anything that they had before. And with being much better they must be convinced that the new things give them more, much more, for their money. The result is that with new things the consumer often does receive a better product and does get more value for his money.

When success comes, particularly spectacular success, the human tendency is to develop self-satisfaction or a self-softening. Salted-in-the-shell peanut producers are not the only ones to show these signs. I have known dentists to behave the same way. When they were struggling to establish a practice, they were understanding and accomodating. They worked hard and made an honest effort to produce the best possible services. Their fees were fair. When patronage increased a good many of these fellows took on an aura of arrogancy; I-am-a-hard-guy-to-get-an-appointment with attitude. They dropped their pretty mask of human understanding. They became indifferent to their appointment schedules and careless in their technical and professional procedures. They let their fees fly out of bounds.

Not every dentist finds it hard to tolerate success. Nor does every businessman. Some people accept good fortune graciously. The ones who are not geared to stand success behave in a characteristic pattern when the tide begins to run against them. They blame the fickle public for the recessions of fortune. They blame the methods of their competitors. They look everywhere for the scapegoat to use to rationalize their failures. That is, they look everywhere except the

one place where they will find the reason—within one's self.

If we are ready to accept the doctrine that success comes to us because of some superior quality within ourselves, we must be prepared to accept the contrary doctrine—that failure likewise originates within ourselves.

Personality Rehabilitation

Dentists are becoming increasingly aware that they have opportunities for broad human service outside the limits of ordinary dental procedures. Within the fields of our routine affairs we have magnificent opportunities to improve the health, the comfort, and the appearance of our fellows. The child who is given an acceptable place in society through the improvement in his appearance by orthodontic skills is an example. The adult who is restored in facial form and appearance by scientific and artistic dentures is another example. Every day we have such privileges to be of human service.

Slightly outside the routine dental treatments, but still within the framework of dental practice are other opportunities that we have to be of inestimable personal service. There are the children who are born with cleft palates, one out of every 700 births, who may need our skills. There are those who lose their facial tissues by injuries of war and peace, by burns and malignant disease. The Armed Services have discovered that the technical skills to help these unfortunates are found within their dental personnel. The great medical clinics, the universities, hospitals, the cancer research centers have given prominent place to dentists who help in facial reconstruction. Not every one who suffers from facial tissue loss can afford care in an institution away from his own home community. In every community in the world are young and old people who may be restored to society by the technical skills that dentists alone possess to rebuild cleft palates, to replace the ears, eyes, noses, faces that are destroyed by injury and disease. In every community the dentist has his chance to serve.

When I write these words, I think with admiration of some of the *dentists* in the United States who are doing important things for human restoration. There is Herb Cooper and his cleft palate clinic in Lancaster, Pennsylvania. There is Cloyd Harkins working in the same field in Osceola Mills, Pennsylvania. There is Bob Appleman in the Zoller Clinic of the University of Chicago, Arthur Bulbulian of the Mayo Clinic, and Andrew Ackerman and his dental staff at the Memorial Cancer Hospital in New York. There are also Alfred Nelson of Royal Oaks, Michigan working in this same field and Manuel Album and his dedicated work with the cerebal palsied children in Philadelphia. In almost every community there are other dentists working side by side with their medical colleagues in carrying on important work in facial restoration and personality rehabilitation.

The child and the adult with polio, with heart disease, with tuberculosis, the cripple, and the blind, receive the attention of nation-wide societies cre-

Feather-like margins
are safest when cast
in Ney's finest bridge gold

NEY-ORO B-2

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for Inlays	for Bridges	for Partials

In your ORAL HYGIENE this month

Would you like to try a little experiment in psychology—with yourself as subject? Try "spotting" your *real* intentions and the *true* significance of the situations in which you find yourself. This is not an easy thing to do because we all unconsciously deceive ourselves to a certain extent. Doctor Abraham A. Low, Medical Director of *Recovery, Inc.*, Chicago, explains some of the ways in which this deception complicates the relationship between dentist and patient, and then concludes:

"The average person is not critical: that is, he is not disposed to fatigue himself with the exacting task of spotting . . . Should this spotting ideal ever materialize, millenium would be at hand . . ."

★ ★ ★

"When the Dentist Operates in a Hospital," what advantages does he gain? What advantages does his patient gain? What is the proper procedure for making arrangements with the hospital, and for preparing the patient? All of these questions are answered in detail by Doctor Louis Willinger. Step-by-step pictures explain the special procedures of hospital operating room technique.

★ ★ ★

The average dentist who has not had much experience with photography may think it is a tough job to plan and carry through the production of a dental film, yet he is usually quite capable of turning out creditable film material, once he has mastered the basic principles of film technique. Doctor Harold Gluck's article, "Some Advice from an Expert Dental Photographer," gives the dentist an authoritative opinion on equipment and procedure.

★ ★ ★

Will your own mouth stand close inspection? Doctor David Tabak suggests that dentists be extremely critical of the appearance of their teeth. His article, "Do Not Do What I Do . . . Do What I Say!" suggests that the dentist take his own dental health advice *personally*.

★ ★ ★

Are you having trouble with past-due accounts? Perhaps the reminder letters that have helped other dentists collect delinquent payments will help you too. Read the article, "Delayed Dollars Detrimental to Dentistry."

★ ★ ★

Is your dental assistant new at her job? Does her attitude toward patients leave much to be desired? Here is an article that may be useful as a tactful reminder: "Suggestions for Dental Assistants."

★ ★ ★

Eight departments and features give you pick-up reading—and a great deal of information.

ated for their rehabilitation. All these valued organizations have vigorous fund-raising campaigns and are engaged in important research and education. The person who cannot speak clearly because of a palate cleft, who is the butt of ridicule because of his difficulty, has no organization to help rehabilitate him. The person with his face destroyed from injury or disease has no association interested in his restoration to society. This is no public conspiracy, no indifference to the fate of the facial cripple. It represents a phase of social progress that we have not yet entered.

Two significant developments in this field of rehabilitation should be reported: On April 27 - 28 - 29, 1953, the 11th annual meeting of the American Association for Cleft Palate Rehabilitation will be held in Atlanta, Georgia at the Biltmore Hotel. A team of experts from the University of Illinois Cleft Palate Center will demonstrate a completed case and the team method of treatment. The program will also include presentations on the integrated specialties: pediatrics, prosthetics, orthodontics, corrective speech therapy, and vocational counselling. The program chairman is Willard T. Hunnicutt, D.D.S., Medical Arts Building, Atlanta, Georgia.

The other development is the creation of the Academy for Oral Rehabilitation of Handicapped Persons to provide high standards of dental care for the physical and mental handicapped. The first meeting of this group will be held in Cleveland during the time of the next ADA meeting. Information may be had from Manuel M. Album, D.D.S., 1930 Chestnut Street, Philadelphia 3, Pennsylvania.

Out of meetings of this kind will come discussion and publication within the dental profession. There will be increasing cooperation with our medical colleagues. The public will hear about these efforts. Then a day will come when some parent of a cleft palate child, or the son or daughter who has a parent suffering from a facial disfigurement, will organize a nation-wide association to help rehabilitate people with crippled faces.

(*Continued on page* 192)